Volume 4 Number 10
October, 1967

THE ATOM

Published monthly by the University of California, Los Alamos Scientific Laboratory, Office of Public Relations, P. O. Box 1663, Los Alamos, New Mexico 87544. Second Class Postage Paid at Los Alamos.

CONTENTS:

Editor: Virginia S. Lees
Photography: Bill Jack Rodgers and Bill Regan
Contributors: Members of the Public Relations staff

Office: D-413 Administration Building. Telephone: 7-6102. Printed by The University of New Mexico Printing Plant, Albuquerque.

COVER:

The spectacular scenery of Los Alamos becomes even more so each autumn as the aspen in the Jemez begin their subtle change from green to yellow-green and finally to a brilliant gold. Photograph by Bill Jack Rodgers.

short subjects

Robert G. Shreffler, alternate weapons division leader, will be on leave of absence from LASL for the next two years to work for the North Atlantic Treaty Organization in Brussels. He will serve as director of the NATO Nuclear Planning Directorate, working with an international staff on the role played by nuclear weapons in NATO.

Shreffler was with LASL from 1949 to 1960 and returned to the Laboratory in 1961. A native of Ohio, he earned his B.A. degree at the College of Wooster, later attended Ohio State University and received his Ph.D. degree from the University of Michigan.

His wife, Laura, and his daughter, Jane, will accompany him to Belgium.

Ernest Salmi, alternate N-5 group leader, left, explains LASL-invented heat pipe to Senator Margaret Chase Smith as LASL Director Norris Bradbury looks on. The Maine senator visited several Laboratory facilities during a one-day visit to Los Alamos last month.

John Zinn, J-10, is at the University of Colorado, Boulder, on a year's leave of absence from LASL. While there, Zinn will be an assistant professor in the aerospace engineering department, teaching thermodynamics and fluid dynamics and conducting research in magnetohydrodynamics. Zinn joined LASL in October, 1957. He received his B.A. degree in chemistry from Cornell University and a Ph.D. degree in physical chemistry from the University of California, Berkeley.

Stanley L. Whetstone, Jr., P-9, is at the University of Washington, Seattle, where he will teach and conduct research in the physics department during the coming academic year. Whetstone, who joined LASL in 1955, received his A.B. degree from Williams College, Williamstown, Mass., and his Ph.D. degree from the University of California at Berkeley. His wife and four children accompanied him on the new assignment. The LASL staff member is on leave of absence during this period.

Among the new books published by Academic Press this fall is *The Refractory Carbides,* by **Edmund K. Storms,** CMB-3. The book is vol. 2 of *Refractory Materials,* a series of monographs edited by John L. Margrave of the department of chemistry, Rice University. Storms' book covers the binary carbide systems of Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Th, U and Pu. A LASL staff member since 1958, Storms received his B.S. and M.S. degrees in chemistry from Pennsylvania State University and his Ph.D. degree in that field from Washington University, St. Louis.

Dr. Robert B. Duffield will be the new director of Argonne National Laboratory, it was announced recently by President George W. Beadle of the University of Chicago. Duffield succeeds Dr. Albert V. Crewe. The new appointment is to be effective Nov. 1. At present, Dr. Duffield is an assistant director of the John J. Hopkins Laboratory of the General Atomic Division of General Dynamics Corp., San Diego, and is in charge of research and development for the Peach Bottom atomic power station. The new Argonne director was on the staff of the Los Alamos Scientific Laboratory from 1943 to 1946 and served as a consultant to LASL from 1948 to 1957.

more short subjects . . .

Beltron J. Wilmoth, a LASL employe since 1946, died unexpectedly at his home at 47 Manhattan Loop, Los Alamos, on Sept. 9. Born Oct. 11, 1906, in White, W. Va., Wilmoth came to Los Alamos as a toolmaker from the Naval Torpedo Station in Alexandria, Va. At the time of his death, Wilmoth was a machinist in SD-5.

Survivors include his wife, Esther, an employe of H-4, and his mother, Mrs. Cora Wilmoth, of Los Alamos. Memorial services were held Sept. 11 at the United Church in Los Alamos, with burial in Elkins, W. Va.

Gerold H. Tenney, LASL technical advisor on nondestructive testing, has been awarded the 1967 Gold Medal, the highest honor given by the Society for Nondestructive Testing.

The presentation will be made by SNT President Richard Stocky at the 27th National Fall Conference in Cleveland Oct. 17. Tenney was cited for "meritorious services to his country . . . to the Los Alamos Scientific Laboratory . . . to his profession . . . and to the society as a member, local section chairman, national president (1954), and long-time chairman of the society's international relations committee."

Tenney came to Los Alamos in 1944 as sergeant-technician with the Manhattan Engineer District. He was graduated from the University of Vienna in 1935, came to the United States in 1939 and was naturalized in 1943. He served with the U.S. Army from 1943 to 1945 and was group leader of GMX-1 until 1966, when he transferred to his present director's office advisory post.

The Materials Advisory Board of the National Research Council recently appointed Tenney to the ad hoc Committee on Nondestructive Inspection and Testing, a group organized at the request of the Department of Defense. This committee will study major problems in the nondestructive testing field, particularly as applied to increasingly exacting demands of sophisticated military systems.

J. Harry Mortenson, NRDS group J-17 reactor physicist, won first prize in the black and white category of the Las Vegas, Nev., Ice Capades photo contest. Mortenson received a $25 photo merchandise order for his photograph taken during a performance of the ice skating show during its recent run in Las Vegas.

"T-3 Fluid Dynamics II," an 11-minute black and white film illustrating computer studies of five different problems, was shown at the 21st Congress of the International Science Film Association in Montreal Sept. 4 through 14.

Group T-3's **John Shannon** produced the movie from 35-millimeter film output generated by the CDC 6600 and the STRETCH computers. High speed computing techniques pioneered by LASL theoreticians allow numerous types of fluid flow phenomena to be studied in detail by a numerical process that closely resembles the performance of an actual laboratory experiment. Group D-8 movie technicians edited and prepared the film for final copying and reduction to 16-millimeter size.

Problems shown in the movie include interaction of a blast shock wave with a supersonic blunt body; interaction of an infinite shock with a cone; flow of viscous fluid over a shelf; hypervelocity impact of an iron sphere on an iron plate; and splash of a liquid drop into a deep pool.

Alice Hall Armstrong, who retired as P-10 assistant group leader in 1964, has been named outstanding woman in the field of science by the board of editors of Who's Who of American Women. P Division Leader Richard Taschek admires her citation. Miss Armstrong, the first woman to earn a doctorate in physics through course work at Harvard, joined LASL in 1950 and has served as a consultant since her retirement.

Hill United Fund Sets $55,000 Goal

A goal of $55,000 has been set for the annual Los Alamos United Fund drive under way this month for the benefit of 15 service agencies in Los Alamos County. Chairman of this year's campaign is Edwin C. Hyatt, H-4 alternate group leader. J. J. Wechsler, W-1 group leader, is chairman of the campaign at LASL.

Agencies to receive funds from the drive include the Cancer Clinic, $7,000; Heart Association, $3,350; Los Alamos Association for Retarded Children, $4,400; Los Alamos Association for the Physically Handicapped, $600; Family Council, $6,000; Boy Scouts, $8,500; Girl Scouts, $8,000; Babe Ruth League, $1,800; Little League, $800; Los Alamos Youth Center, $500; Red Cross, $5,200; Salvation Army, $5,000; Traveler's Aid Society, $100; United Services Organization, $700. The Lassie League is also participating in the campaign but has not requested any funds this year. To help member agencies meet unexpected expenses—such as those which arise from disasters—and to help agencies that unexpectedly lose other sources of income—such as state or federal support—an emergency reserve fund of $3,050 has also been allocated.

The Los Alamos United Fund has no paid employes, since all services are donated. Operating expenses for the United Fund during 1967—including $780 for campaign expenses, $400 for write-off of unpaid pledges and $250 for miscellaneous operating expenses—are taken from United Fund reserves, with any surplus to be carried over to next year.

In a message to LASL employes, Director Norris Bradbury points out, "How much we give and how or whether we wish to apportion the donation is a personal matter, but this year's goal is the highest ever attempted, and I urge that you give the United Fund your strong support."

The $55,000 goal for this year is less than one-tenth of one per cent of the estimated total annual payroll in Los Alamos—and amounts to $3.30 per capita, based on a population of 16,700. In comparison, last year the town of Salem, Ohio, with a population of 17,000, raised $91,000; Clearfield, Pa., population 17,000, raised $92,000; and North Attleboro, Mass., population 16,000, raised $57,000. Last year, Los Alamos, with a popuation of 16,000, raised $47,000 in the United Fund drive.

As a guide to the amount to donate to the United Fund, the board of trustees suggests the equivalent of one hour's pay per month—about six-tenths of one per cent of gross annual salary. Based on this, an employe with a salary of $12,000 could consider $72 a "fair share" contribution, according to the trustees.

Contributions may be made in lump sum amounts, in installments or through bank deductions.

60 Participate in Test Readiness Exercise

Approximately 60 Los Alamos Scientific Laboratory employes are participating in the joint Department of Defense-Atomic Energy Commission test readiness exercise in the Pacific this month. Conducted by Joint Task Force Eight, comprised of DOD and AEC and contractor personnel, the exercise is designed to help maintain facilities, resources and personnel proficiency in a state of readiness to promptly begin nuclear tests in the atmosphere, should it ever be deemed necessary.

As with the exercises conducted last fall, Arthur N. Cox, J-15 group leader, is serving as associate scientific deputy for JTF-8. Neel W. Glass, J-16 group leader, is commander of LASL's test group 8.1.1, with Robert W. Peterson, J-16, as deputy commander.

In the test readiness exercises, B-52 aircraft drop instrumented test-simulators while other aircraft in the drop areas gather simulated nuclear effects data. In addition, several instrumented and test simulator-equipped rockets will be launched from Johnston Atoll.

No nuclear weapons are involved in any part of this exercise.

JTF-8 is the organization responsible for maintaining the nation's readiness capability to perform testing in the environments now prohibited by the limited nuclear test ban treaty.

When the administration submitted the limited nuclear test ban treaty to the Senate for approval in 1963, it stated that this test readiness capability would be maintained.

According to a joint DOD-AEC statement, "The United States earnestly and sincerely hopes that the limited nuclear test ban treaty will not be abrogated, and that its atmospheric nuclear testing capability will not have to be used. It is nonetheless essential that such a capability be maintained, in the interest of national security."

LASL employes participating in the test readiness exercises include personnel from J-DO and J division groups 1, 3, 6, 8, 10, 11, 14, 15 and 16; P-1 and P-4; H-1, 3 and 6; D-4 and D-8; SP-2 and SP-3 and Mail and Records.

The exercises began in mid-September and will continue until the middle of October.

Stan Ulam Retires; Will Head Colorado Math Department

Stan Ulam, who has been called "the father of the hydrogen bomb," will retire from the Los Alamos Scientific Laboratory Oct. 14. He will become chairman of the mathematics department at the University of Colorado.

Dr. Ulam, whose basic ideas led directly to the development of thermonuclear weapons at Los Alamos, joined the Laboratory in 1944. He became a group leader in T division in 1946 and since 1957 has served as a research advisor in the director's office.

An internationally known mathematician, Ulam is credited with developing the "Monte Carlo method", a procedure for finding solutions to mathematical and physical problems through random sampling. This method became highly practical with the introduction of high speed computers and permits the solution of problems not amenable to more orthodox methods of analysis. The Monte Carlo method is now an accepted tool in such widely separated fields as weapons design and traffic control, and it has also served in the solution of such purely mathematical problems as the evaluation of multiple intergrals and the study of the Schrödinger equation.

"The potential effects of Dr. Ulam's work in the field of mathematics may well have far-reaching influence on the development of scientific thought," a LASL colleague has said. Ulam's interests include theoretical physics and advanced concepts in biology, as well as mathematics and modern computational methods. He has made significant contributions to the fields of set theory, topology, ergodic theory, probability and number theory. Ulam's basic ideas on the mathematical treatment of hydrodynamics have led to successful methods for following the three-dimensional flow of fluids. Also interested in space travel, Ulam has proposed several highly advanced methods of nuclear propulsion.

Author and co-author of many papers, Ulam wrote a book, *A Collection of Mathematical Problems,* dealing with many of the subjects in which he is interested.

Born in Lwow, Poland, in 1909, Ulam earned his M.A. and Sc. D. degrees at Polytechnic Institute at Lwow. After lecturing at various academic institutions in Europe, he came to the United States in 1936 as a visiting member at the Institute for Advanced Studies, Princeton, N.J. He was a lecturer in mathematics at Harvard University from 1936 until 1940, when he became assistant professor of mathematics at the University of Wisconsin. Since joining the Laboratory in 1944, he has also served during leaves of absence on the faculties of the University of Southern California, Harvard University, Massachusetts Institute of Technology, the University of Colorado and the University of California at San Diego.

Ulam is a fellow of the American Academy of Arts and Sciences, a member of the National Academy of Science, the American Mathematical Society, the American Physical Society, the American Philosophical Society and a past member of the Harvard University Society of Fellows.

He is a consultant to the President's Scientific Advisory Committee and was a member of the Air Force Space Planning Committee, the Twining Committee and special panels of the President's Advisory Committee. Last year he received the Alfred Jurzykowski Foundation millennium award for his creative work in mathematics.

Ulam and his wife, Francoise, have a daughter, Claire.

Gritzo

Orth

Sanders

Advanced Study Recipients Named

Ludwig A. Gritzo, GMX-3, Charles J. Orth, J-11, and William M. Sanders, K-1, have been selected to conduct full-time graduate study in pursuit of advanced degrees this year under the sponsorship of the Laboratory's Advanced Study Program.

All three staff members have chosen the University of New Mexico as the institution where they will study. Gritzo and Sanders will work toward Ph.D. degrees in nuclear engineering, while Orth will complete requirements for a doctorate in radiochemistry.

Gritzo, on the LASL staff since July, 1958, received his B.S. degree in chemical engineering from the University of Missouri and his M.S. degree in nuclear engineering from UNM. He is married and has two children.

Orth joined LASL in 1956. He completed his undergraduate work at San Diego State College, having received his B.S. degree in chemistry. He is married.

Sanders received his B.S. degree in nuclear engineering from Kansas State University and an M.S. degree in that field from UNM. He is married with two children and has been with LASL since May, 1962.

Candidates for the program are screened by their division leaders and by a special director's committee. Those selected, after approval of the AEC, are allowed one-half the cost of basic tuition, in addition to partial salary for a period of not more than 12 months while engaged in full-time study.

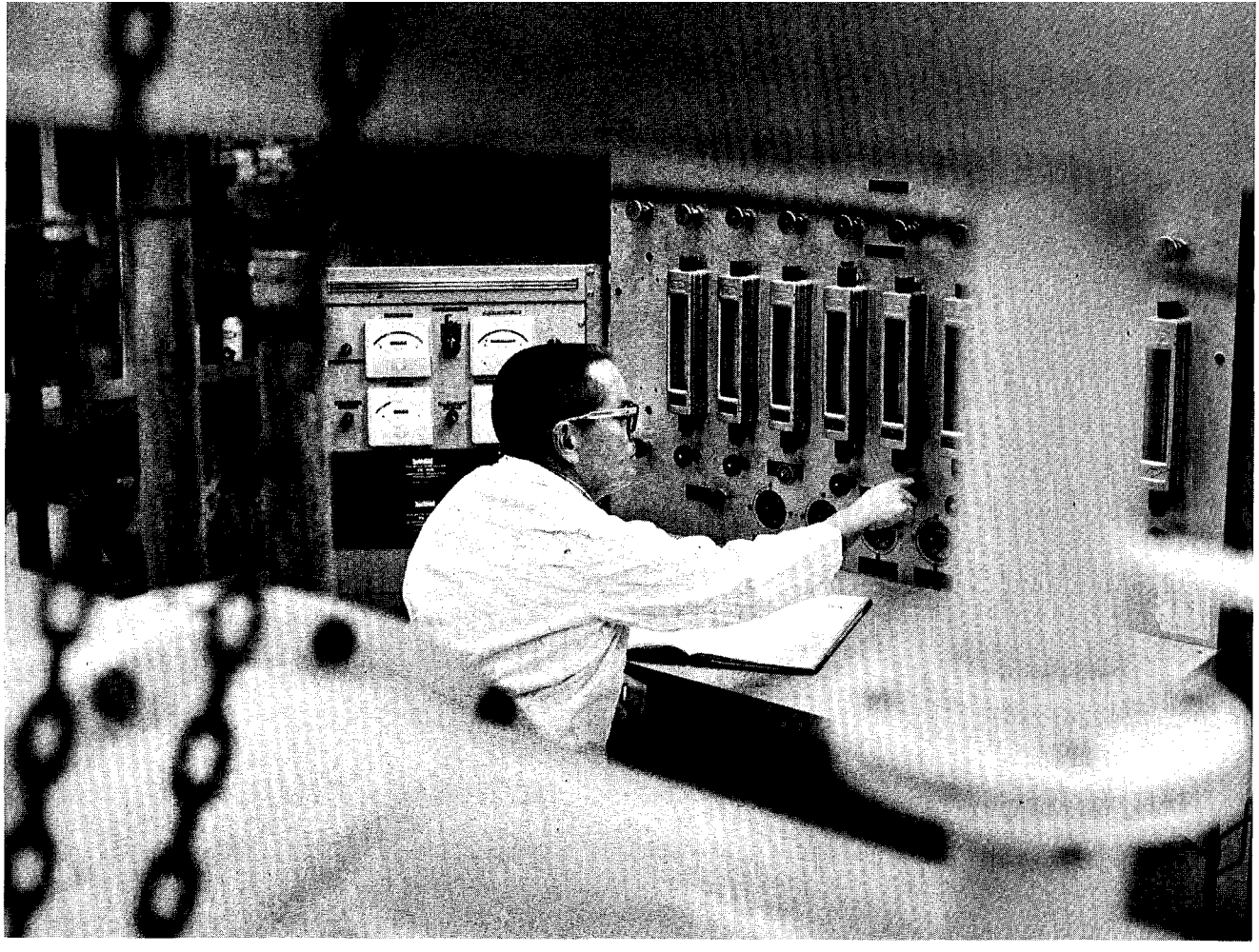
To be eligible for consideration for the program, a candidate must have: 1) a bachelor's degree plus approximately two years of graduate credits in science or engineering which are applicable to the field in which he proposes his study, 2) three or more years of continuous full-time employment by LASL immediately preceding his application and 3) a feasible plan of graduate study in a recognized college or university in the United States.

Morgan, Shlaer Retire

Two long-time LASL employes retired in September.

Austin M. Morgan, SD-5 machinist, retired Sept. 11. He joined LASL in March, 1949, in the Los Angeles branch of the Shops Department. Six months later, he came to Los Alamos and group SD-1. He transferred to SD-5 in July, 1954, and has been with that group since. Although born in Texas, he prefers to call New Mexico home, and after some traveling, he hopes to settle somewhere in New Mexico. He has a son, Michael, with the U.S. Army in Shreveport, La.

Simon Shlaer, H-1 staff member, retired Sept. 30. He came to Los Alamos in 1947 after serving as research associate at Columbia University for nine years. Shlaer received his A.B., M.A. and Ph.D. degrees in biophysics from Columbia. During his entire time with LASL, he has worked in the field of radiologic safety. After retirement, he and his wife, Lee, who retired from LASL in June, plan to make Miami, Fla., their home. They have three sons—Bill, a staff member in MP-3; Robert, who is attending Cambridge University, England; and Alan, a student at the University of New Mexico.



Money adjusts carrier gas flow to change rate of vapor production shown by rate of weight loss meter on electronic scale.

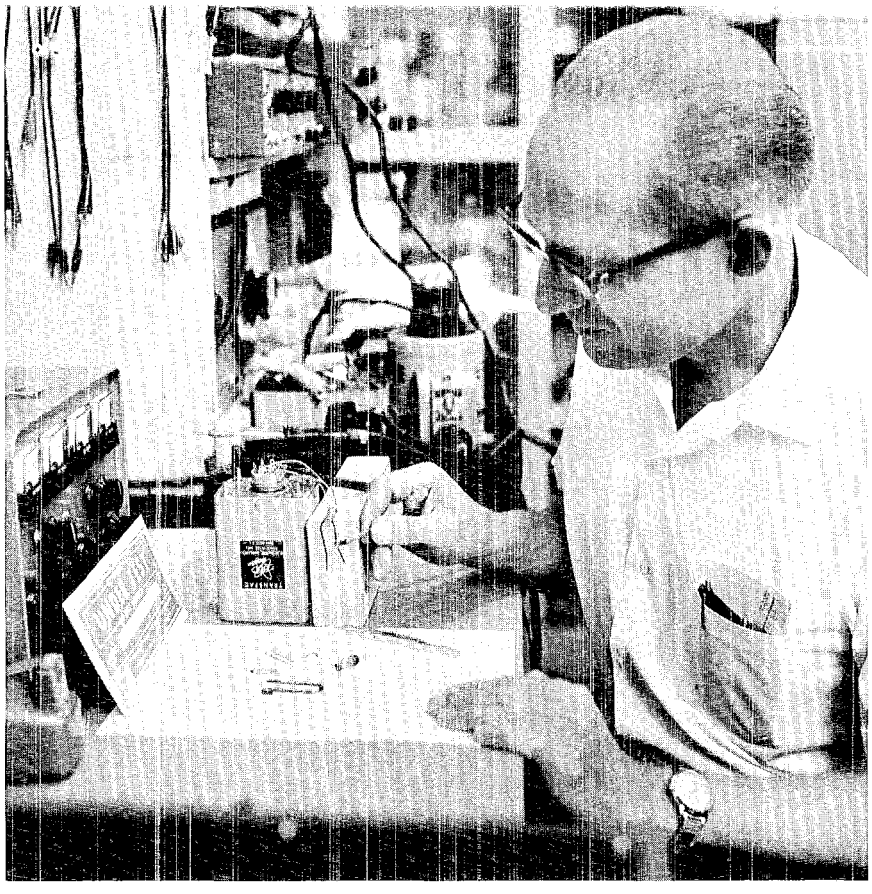
Electronic Scale Measures Vapor Weight Loss

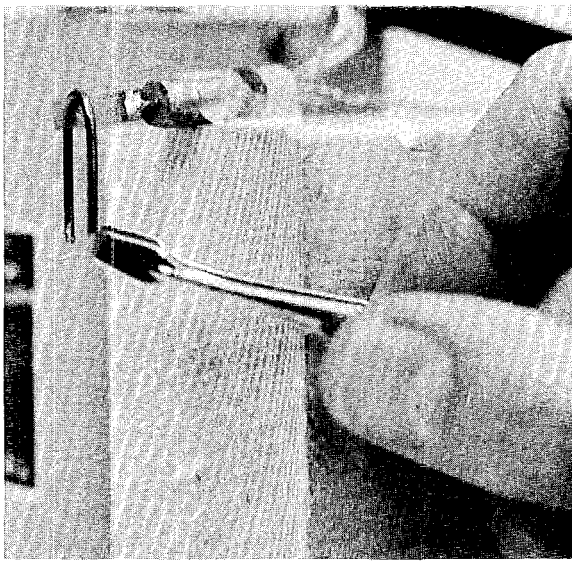
By Bob Masterson

Photographs by Bill Jack Rodgers

Rate of weight loss is a quantity that is frequently of great interest to a wide variety of people, including scientists, engineers, managers of overweight prizefighters and dieting housewives. But, whereas the latter two groups are usually interested only in increasing the rate of weight loss, scientists and engineers are more likely to be interested in measuring this quantity quickly and accurately, and this can sometimes be difficult or even impossible using conventional techniques.

One such measuring problem which could not be handled by mechanical devices has been solved by an all-electronic scale designed and built by George N. Rupert of the CMB-3 high temperature chemistry group. The problem—to measure the rate of mass flow of a chemical as vapor—was encountered by





ABOVE: Closeup shows the transducer for the low-range (up to 1 ounce) scale Rupert is presently building. The blade, on which copper-wire weight is resting, moves the plate of the vacuum tube (the small metal cylinder) resulting in an output signal (the plate current) proportional to the weight. LEFT: Rupert tests the operation of a bench model of the new scale.

another CMB-3 scientist, Richard K. Money, in his developmental study of a production process used for certain components of the Rover Program (nuclear rocket) reactors. In the process, the chemical is vaporized in a stainless steel vessel or saturator suspended in a resistance furnace. The vapor thus produced is transported through a pipe by means of a carrier gas (argon) to the reaction chamber. Products are then sent to the N-1 and GMX-1 groups where the quality and effectiveness of the process results are evaluated.

One of the factors strongly influencing the quality of the results is the rate at which the chemical is vaporized in the saturator. By adjusting the flow of carrier gas and the saturator temperature, the rate of vaporization can be regulated.

Rupert's new electronic scale not only measures the rate of vapor production—that is, the rate of weight loss from the saturator—but also shows the gross weight of the saturator, the total weight lost during a run and the deviation of the measured rate from a preset desired rate.

The sensing device of the new scale is a semiconductor transducer or load cell from which the saturator is suspended in the furnace by a flexible steel cable. A transducer is any device that converts energy in one form into energy in another form. An example is the telephone receiver, which converts electrical energy into acoustical or sound energy.

The heart of the commercially produced load cell used by Rupert in his balance is a tiny silicon crystal only 3/8 of an inch long, 1/16 of an inch wide, and 5/1,000 of an inch thick. This crystal has the property that its electrical resistance changes as it is strained—bent, stretched or otherwise deformed—as a result of being subjected to a stress (load or weight). Incorporated into the load cell is a wheatstone bridge circuit that senses the resistance of the crystal and produces an electrical analog output signal, in the form of a voltage, that is proportional to the resistance of the crystal and therefore proportional to the gross weight suspended from the load cell. This signal is amplified 25 times, so that one volt equals 10 pounds, and is displayed on a properly calibrated voltmeter.

This amplified signal (V_1) then goes into another amplifier circuit which measures the total weight loss of the sample during a run.

continued on next page

Electronic Scale . . .

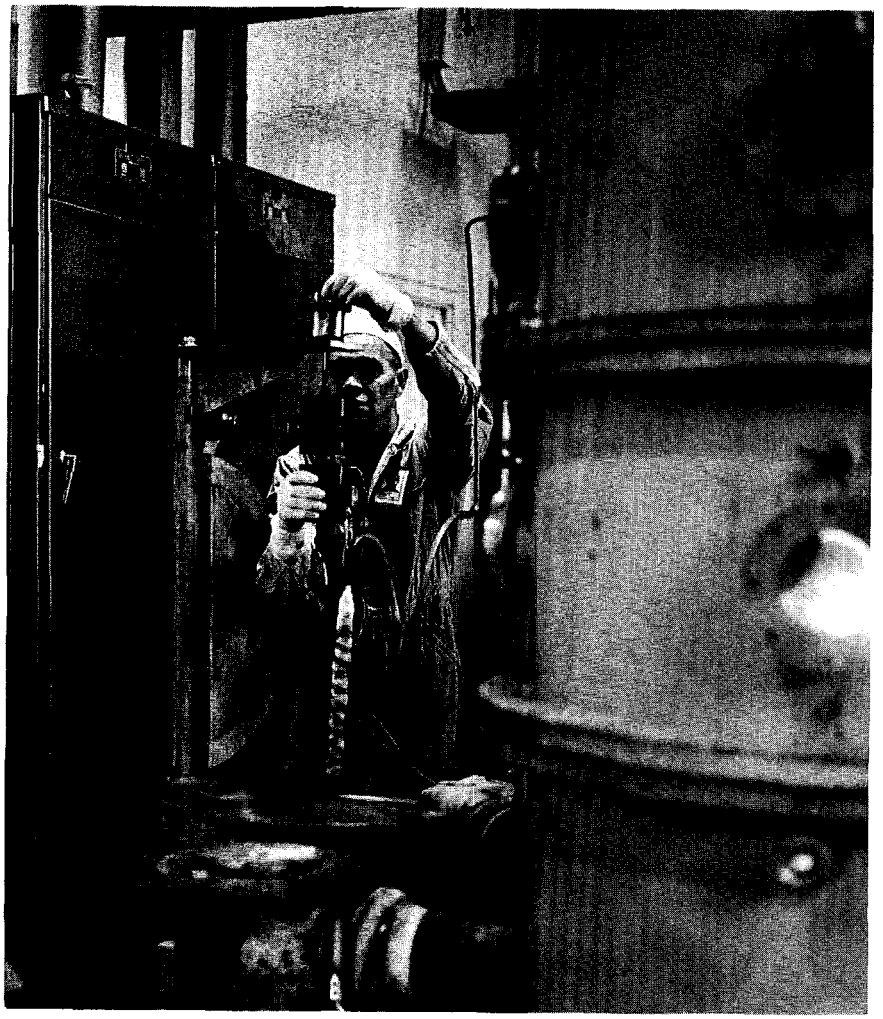
continued from preceding page

One volt output from this circuit indicates a weight loss of 10 pounds and produces a full-scale deflection on a second meter. At the beginning of a run the "zero weight loss" control is used to set the needle of this meter on zero. If the weight loss exceeds 10 pounds during a run, a "20-pound supression" control may be used to bring the meter pointer back on scale. The total weight loss divided by the length of time of the run gives the average rate of weight loss. This can be used as a check on the rate-of-weight-loss circuit.

This rate-of-weight-loss circuit, known as a differentiator circuit, is a standard circuit used in analog computers. It measures the instantaneous rate of change of the amplified load cell output voltage (V_1)—that is, the change in V_1 per unit time (dV_1/dt), which is equivalent to the change in weight per unit time. The differentiator circuit produces an output voltage (V_2) proportional to dV_1/dt. This voltage (V_2) is displayed on a third voltmeter, calibrated in units of 0.1 pound per 10 minutes, which shows the rate of weight loss of the sample.

A fourth meter shows the deviation of the measured rate of weight loss from a desired preset rate. This shows a maximum deviation of 0.5 pound per 10 minutes either above or below a zero point. The desired rate is set by means of a "desired rate" dial. This meter can be observed by an operator who can correct any deviations from the desired rate of vapor flow by controlling the rate of the carrier gas.

It would be simple to feed the signal from the "deviation circuit" into a servomechanism which would automatically control the carrier gas flow to keep the deviation from the desired rate loss at zero. Such a combination of the electronic scale and a servo system has great potential for use in industry where it could be used to control many processes easily and precisely. Examples would be mixing processes where the rate of addition of ingredients must be controlled by means of valves on hoppers or tanks or processes in which the rate of production of gaseous products can be controlled by adjusting the temperature of the system. It would also be simple to program the controller to add ingredients at a varying rate.



Bobby J. Phillips, CMB-3 technician, hooks up a transducer to the overhead support arm of one of the furnaces used by Money. Reaction vessel is on the right.

The device is also adaptable to many different applications. Rupert is currently developing a scale to weigh small samples up to one ounce subjected to temperatures as high as 5500°F. This temperature is twice the sample temperature that can be handled by present commercially available scales.

The compactness (two by one and a half by one and a half feet), simplicity and reliability of Rupert's new scale also enhance its usefulness for industrial and commercial applications.

In fact, Rupert has learned that one of the large industrial contractors in the NERVA (Nuclear Engine for Rocket Vehicle Application) project is planning to put one of the new electronic scales to work in its research and development programs. It is also reasonable to expect that this new device will find even further applications, not only in the CMB-3 program of high temperature chemistry research and development, but also in science and industry in general.

"WITH THE RAPID expansion and growing complexity of science, the training period for an individual who aspires to the rank of science has lengthened. Although the Ph.D. degree, a few years ago, was the *ne plus ultra* in scientific education, a period of postdoctoral research is now considered an essential credential of the well-trained scholar."

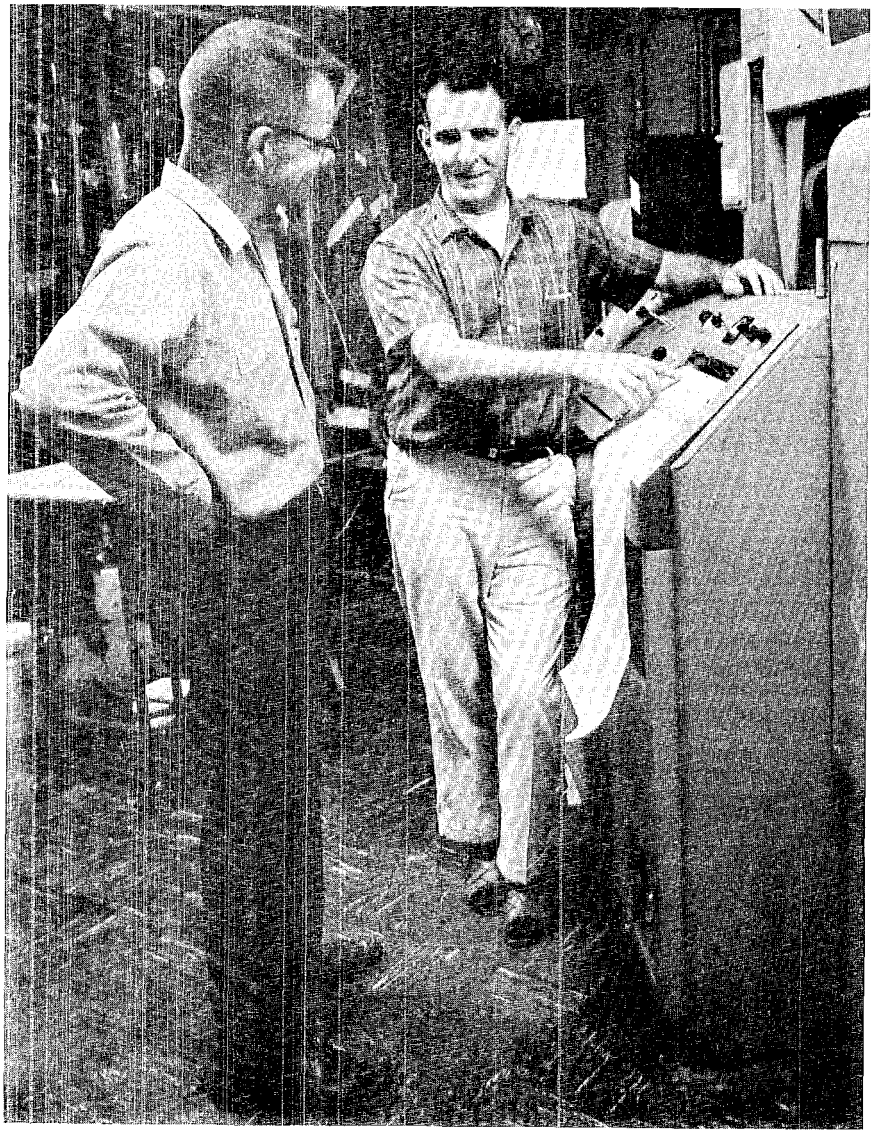
So concluded a 1963 report to LASL Director Norris Bradbury. Although they may have overstated their case, the authors were serious in their efforts to establish a postdoctoral research program at LASL. And successful, too, for Bradbury advised the AEC on Dec. 6, 1963: "The idea behind such appointments is to assure a flow of young Ph.D.'s through our groups having basic research programs in progress. We believe that such temporary appointments promote the work of the Laboratory, provide the incumbents with experience beneficial to their careers and have a vitalizing effect on our permanent staff. I have taken steps to formalize these appointments with the hope of encouraging a limited number of them."

Postdoctoral research is not new, but until a few years ago most of it was confined to university campuses, where newly graduated Ph.D.'s can often obtain fellowships to finance a year or two between the pressures of getting the Ph.D. and the pressures of a permanent career, conducting research on subjects largely of their own choosing and at their own pace.

Proponents of postdoctoral research argue that the exponential growth of human knowledge makes the continuation of work beyond the Ph.D. a matter of necessity. Nationwide, at the present time, as many as one-quarter of all new Ph.D.'s in the sciences may be involved in "postdoc" research.

The LASL Postdoctoral Program was not begun entirely out of altruism for the new Ph.D. The low

continued on next page

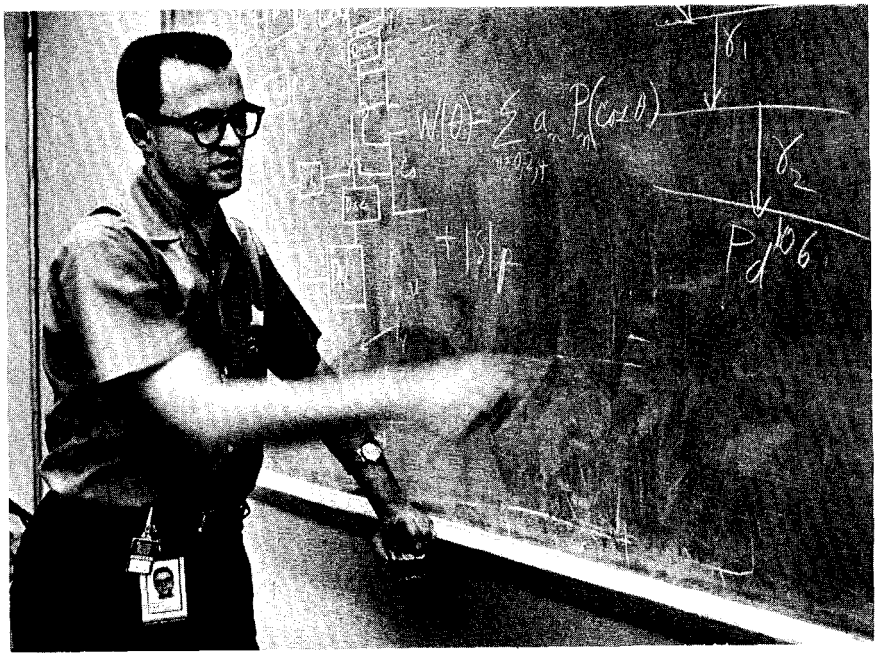


Robert Ryan, right, has been primarily interested in the investigation of molecular forces from vibrational frequencies as determined by infrared and Raman spectroscopy. Particular attention is paid to the accurate determination of force constants for simple molecules, such as nitrosyl halides, through the method of isotopic substitution. His research is under the supervision of Wes Jones, CMF-4, left.

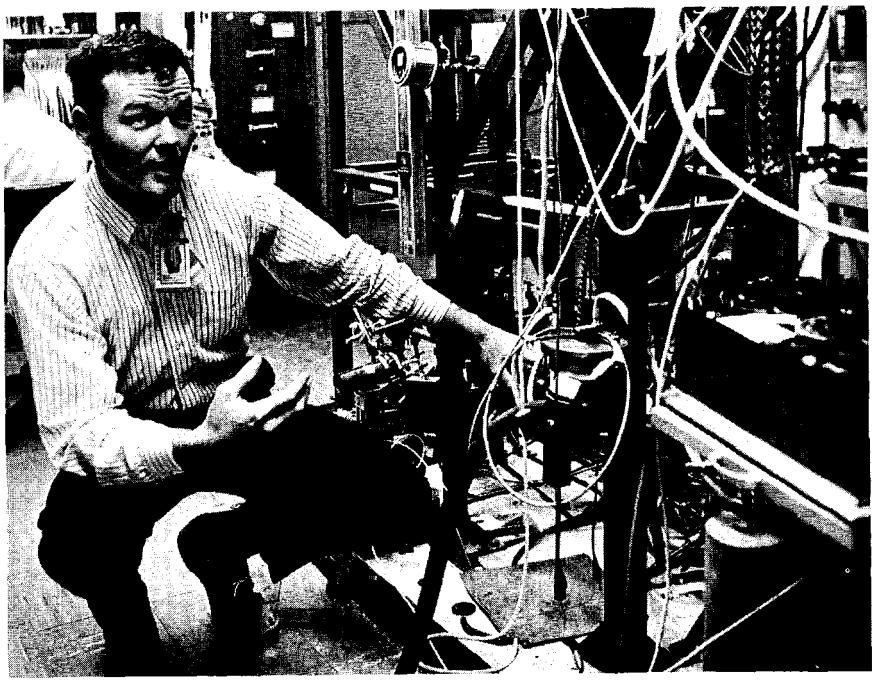
The Postdocs: A Vitalizing Effect

By Del Sundberg

Photographs by Bill Regan



ABOVE: Enloe Ritter, who received his Ph.D. from Johns Hopkins, describes his work as time reversal invariance in nuclear forces. Collaborating with Roger Perkins, P-DOR, he is seeking the presence of an interference term which time reversal invariance requires to be identically zero. Experimentally, this involves correlation of the angular distribution of beta emission in relation to gamma, gamma emission in the decay scheme of ^{106}Ru to ^{106}Pd. BELOW: Low temperature solid state experiments are being conducted by Rice University graduate Martin P. Maley and Dean Taylor of CMF-9. Using a Mössbauer spectrometer, they are now studying internal magnetic fields and electric field gradients at the site of ^{57}Fe nuclei in dilute alloys of ^{57}Fe embedded in various metallic hosts. The magnetic behavior of the localized moments associated with the dilute iron impurity can then be inferred from these internal fields.



Postdocs . . .

continued from preceding page

turn-over rate (about five per cent a year) among scientists and engineers at LASL has been of concern to the Laboratory director and other senior supervisors for some years. It is generally believed that a productive research program needs continued stimulation from a steady flow of new ideas and techniques. The knowledge explosion in the sciences, particularly, means that a research group which is too stable may face the possibility of gradual decline in productivity.

By 1962, several group leaders, including the late Joe Lemons, CMF-2; R. B. Leachman, P-12; J. L. McKibben, P-9; and Wright Langham, H-4, had begun informally to hire postdocs by setting aside a ceiling point to hire into their respective groups a Ph.D. on a one-year appointment.

Research Advisor John Manley and Bill Crew, then assistant director for scientific personnel, proposed in mid-1963 the establishment of a small postdoctoral program. Quite independently, an *ad hoc* committee of H-4 also suggested a formal program of hiring young Ph.D.'s for one- or two-year periods. It was agreed that the research effort of the Laboratory would certainly be enhanced, and the superb facilities and reputation of the LASL staff would clearly profit the postdoc. Furthermore, it was argued, the entire Laboratory would eventually benefit by having numerous "graduates" of postdoctoral research on faculties of universities and on the staffs of other laboratories throughout the country. Unsaid, but implicit in this, is the hope that the ex-LASLites-turned-professors would send some of their better students back to LASL.

Such a belief was recently expressed by Milton Eisenhower, president of Johns Hopkins University, when he said of postdoctoral researchers: "There is a certain selfish purpose in it from our

point of view because these persons will go on to become professors, deans and presidents at other institutions and they will keep Johns Hopkins' name associated with them."

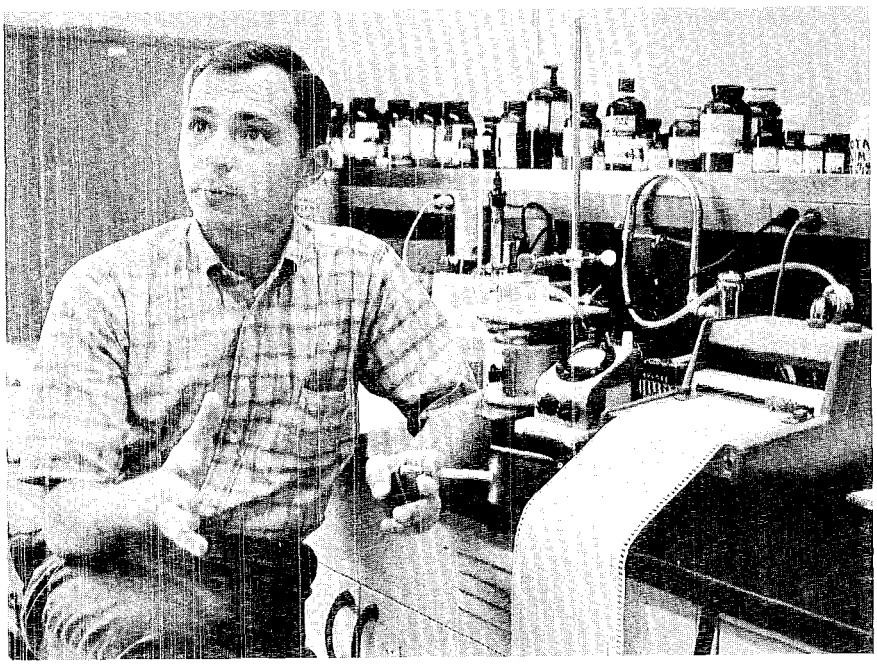
Bradbury's approval of the Postdoctoral Program in 1963 included some specific ground rules, which are still basic policy:

- Appointees will be young, preferably in the age bracket of 25 to 30 years.
- Appointees shall have received their Ph.D. not more than three years preceding the date of appointment.
- Appointments are for one year, renewable for a second year, but no one shall continue beyond two years.
- Research undertaken must contribute to the professional growth of the appointee and be publishable in the unclassified literature.

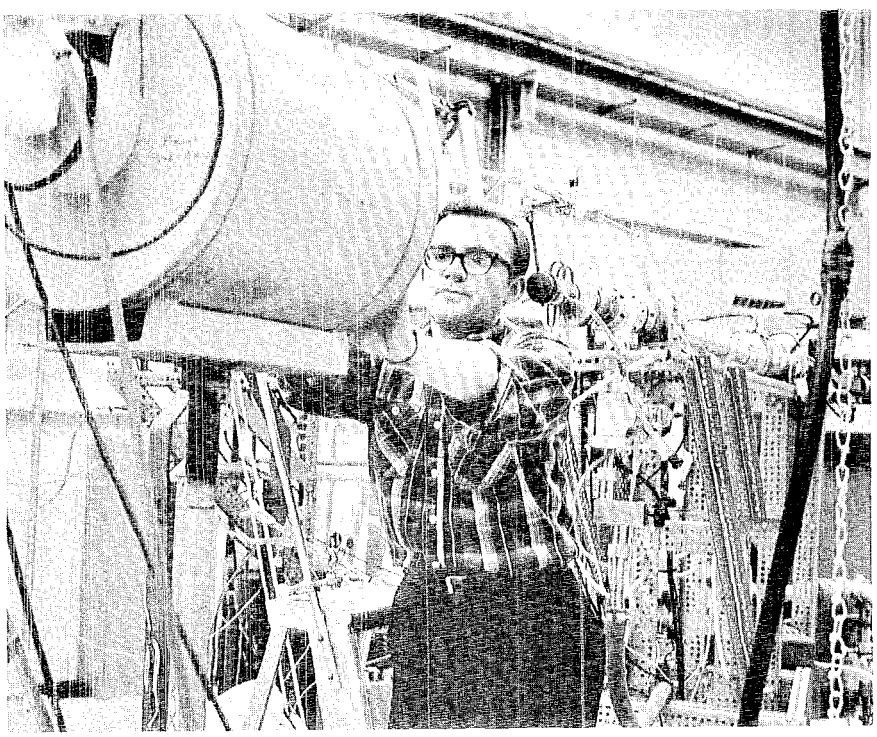
A Postdoctoral Committee was appointed, responsible for review and approval of all proposed appointments. The committee has developed many of its own operating procedures and recommended rules for administration of the Postdoctoral Program. Salaries are fixed annually according to a schedule suggested by the committee to the director, and are based quite frankly on "what the competition is doing." Postdoctoral salaries, although pegged lower than salaries of permanent LASL staff members with equivalent training, tend to be a little higher than the average offered by college and university fellowships for similar work.

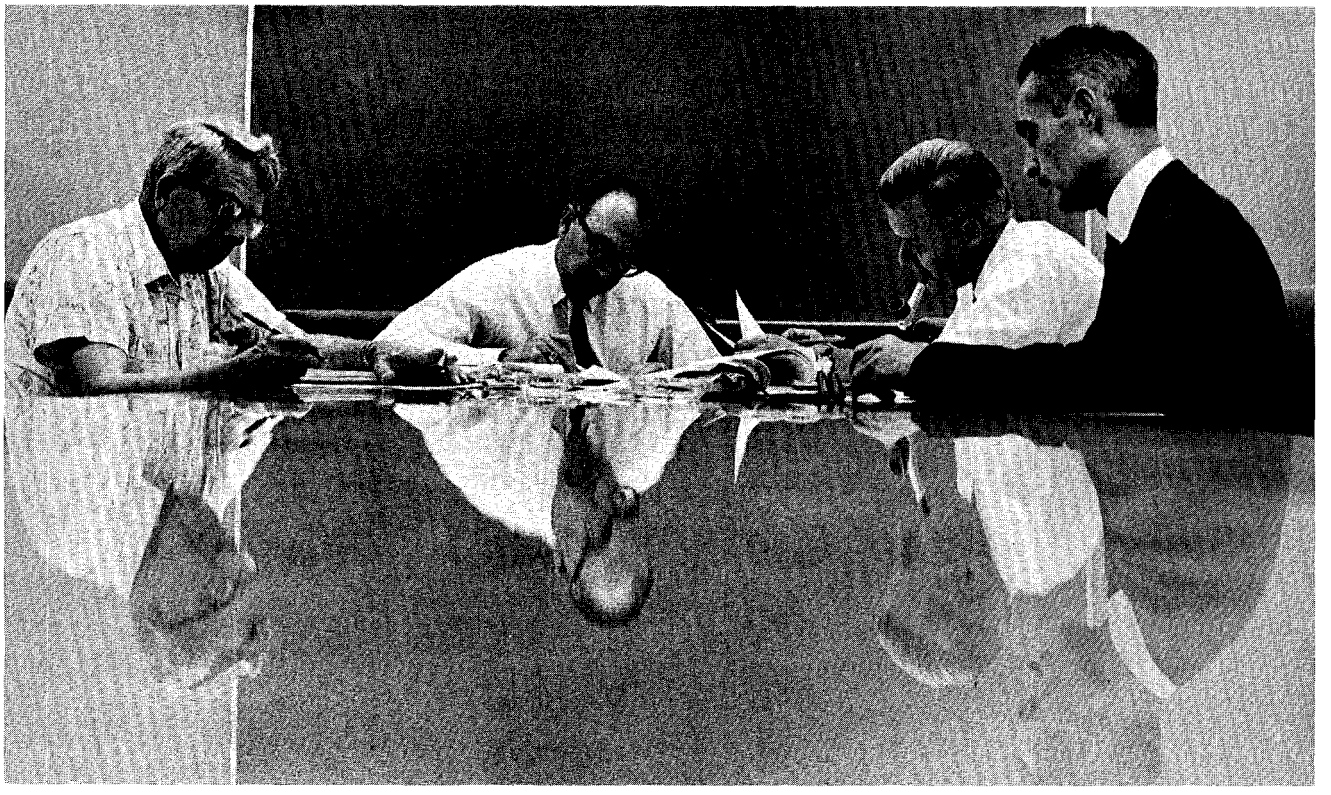
The Postdoctoral Committee concerns itself not only with the quality of candidates but with adequacy of their supervision at LASL. Far from being a rubber stamp group, the committee has rejected about 15 per cent of the 90 postdoctoral proposals it has reviewed during the past three and a half years. In some cases, the candidate himself

continued on next page



ABOVE: Energy metabolism of cultured cells is being studied by Joseph Machinist. His research, under the general supervision of Chuck Gregg, H-4, involves the isolation of mitochondria from lymphoma cells and determination of both the degree of respiratory control and the effects of respiratory inhibitors on the isolated mitochondria and intact cell. A Purdue Ph.D., Machinist has also done postdoctoral work at the University of Texas. BELOW: Christopher F. Masters positions a counter in the target area of the N-6 Cockcroft-Walton. His research is concerned with new ways of measuring delayed neutron yield for the N-6 safeguards program, using the Cockcroft-Walton as a source of 14 meV neutrons. A Ph.D. from Cornell, Masters works with Darryl Smith and Munson Thorpe, N-6.





Postdoctoral committee members, from left, John Manley, LASL research advisor; Charles Canfield, personnel director; Henry T. Motz, associate P division leader; and Wright Langham, H-4, screen proposals for postdoctoral research. Other committee members are Conrad Longmire, T-DO; William W. Wood, GMX-10; and Edward Hammel, CMF-9.

Postdocs . . .

continued from preceding page

or his training was not considered of high enough quality; in some cases, the arrangements for supervision by the sponsoring group were considered too ephemeral, and occasionally the research problem on which the candidate proposed to work was not clearly suitable or publishable.

Since 1964, when the first participant, John L. Malanify, joined LASL, more than 40 persons have been involved in postdoctoral research. Fifteen have already finished their appointments; seven of them are now in university positions, six have gone to industrial or governmental laboratories, and two have remained in permanent LASL positions. There are 27 now working in Los Alamos of the 30 allowed to be on board at any one time.

One of the measures of the program's success, admittedly imperfect, is the number of publications emanating from it. The 15 participants who have completed their tenure at LASL were responsible for authoring or co-authoring 68 papers. Although some of these would probably have appeared at a later date in any event, there is little question that the LASL output of publishable research has been enhanced.

Toward the end of the postdoc's tour of duty, his LASL supervisor and the Personnel Department are encouraged to assist him in finding future employment. It is permissible, but definitely not encouraged, for him to accept permanent employment at Los Alamos.

In addition to its well known programmatic contributions to the national welfare, Los Alamos is becoming a true regional center for basic research in the natural sciences. The Postdoctoral Program is playing an increasingly important role in that enterprise.

thE LASL aRTIStS

By Bill Richmond

Photograph by Bill Regan

Barbara Hannemann, D-3 illustrator, works on a lettering problem at her drawing board.

THE OLD SAW that "a picture is worth 10,000 words" will always be debated between those who write and those who illustrate. However, most will agree that "a picture and 100 words are worth 10,000 words."

And, if the writer is attempting to convey an idea or put across a point, well-done art work is essential. This service is performed at the Los Alamos Scientific Laboratory by the illustration group—D-3.

The relatively small group of technical illustrators, under group leader Bill Johnson, recently established a group record of 110 work orders in one month. The average is about 80. Also, as Johnson points out, the group has had as many as 500 graphs on one work order!

"About 75 per cent of our work is for reproduction in reports, journals or as slides," Johnson said, "with the largest percentage being graphs. The other 25 per cent is illustrations for booklets, pamphlets, brochures, posters, patent drawings, master forms, charts, tables, schematics, diagrams, etc."

The normal time for a job is one to two weeks, depending on the backlog of orders and the number of X-priority orders received. An X-priority, which must be signed by a division or department head, means "drop-everything-and-do-this-job-first!!!!"

One of the biggest jobs ever handed D-3 was in connection with the 1962 visit of President Kennedy.

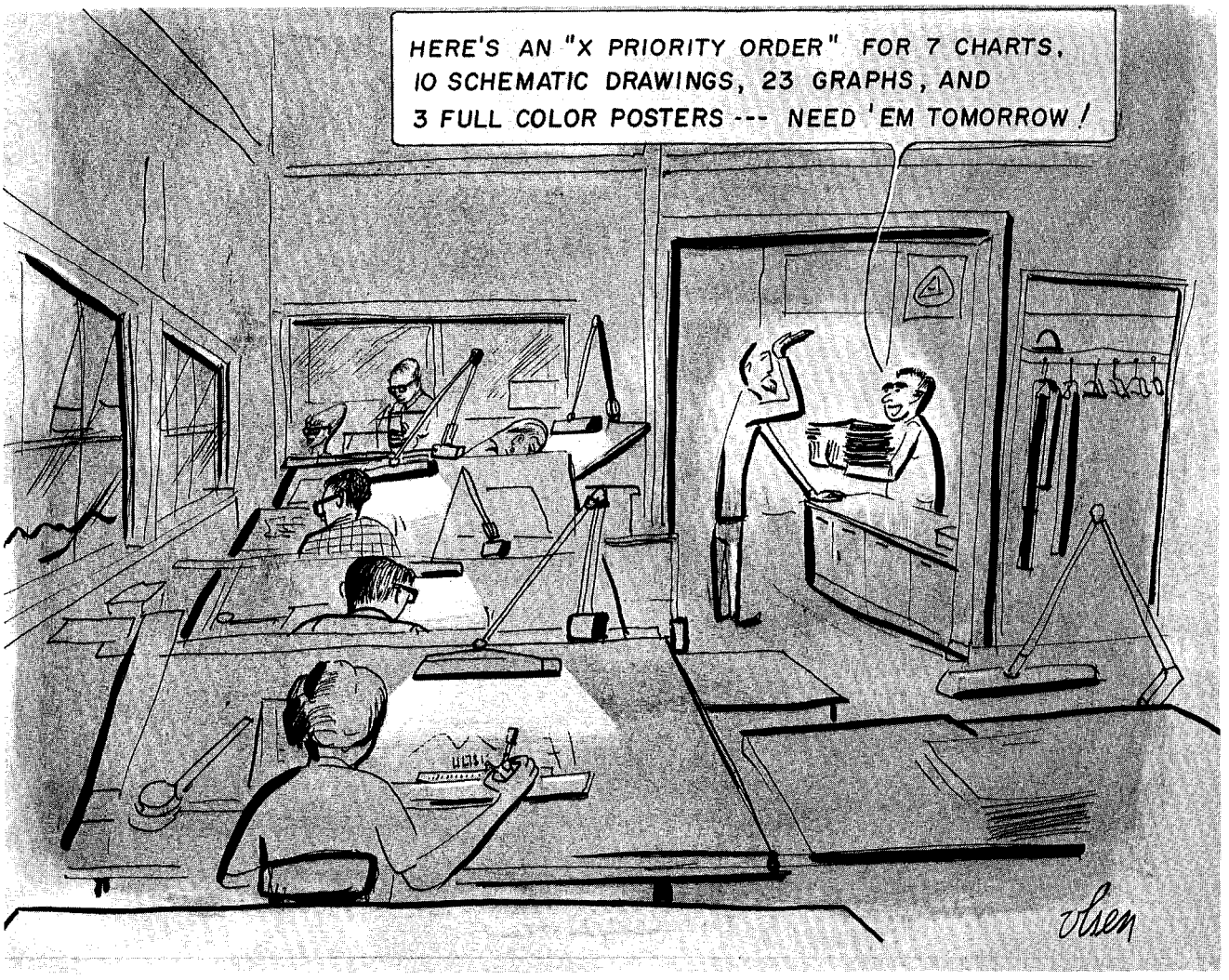
Johnson helped in working out exhibit arrangements and in designing the display areas. The technical artists of D-3 put in about 850 man hours on 30 huge posters for the displays to show President Kennedy the type of projects LASL was engaged in. These posters were done on a production-line basis, Johnson said.

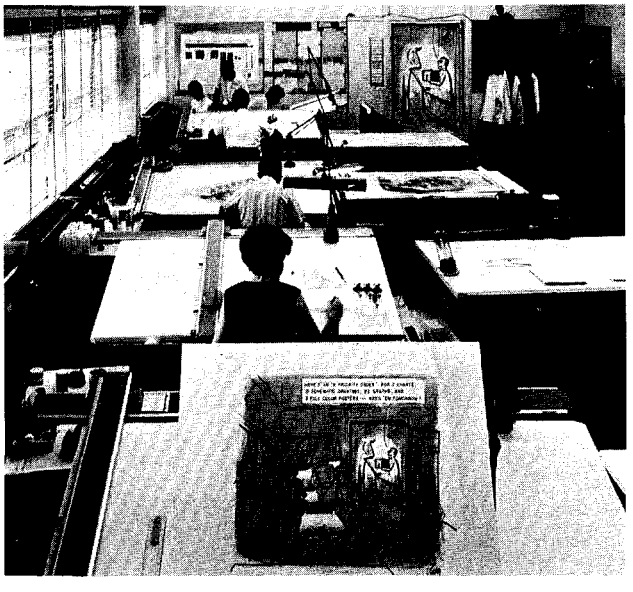
"The first person sketched, in pencil, a rough outline and passed it back to artist number two," he said. "The second inked in the sketch and handed it to number three who did the lettering and passed it back to number four who did the coloring."

And, of course, all this work for the presidential visit was on an X-priority basis.

In addition to the drawings and other related work, one D-3 illustrator spent three weeks at her sewing machine turning out draperies that decor-

continued on next page





From his vantage point at the back of the room, Hal Olsen, D-3 alternate group leader, sketched the artists at work and (photo, left) provided an inspiration for photographer Bill Regan.

continued

ated the displays and separated the classified from the unclassified sections. The need for 300 yards of corduroy depleted the stocks of all New Mexico stores and required air shipments from a manufacturer in New York.

One of the hardest jobs D-3 has been called on to do was a cutaway drawing of LASL's Water Boiler reactor.

The job was complicated because a comprehensive set of drawings was not made before or during construction, and the actual "guts" of the reactor were a total blank since no one has seen the inside of the reactor since it was built. The first step was to go through the photo archives of D-8 looking for pictures pertaining to the Water Boiler. About a dozen photos were found which were taken during construction. It was possible to identify some of the people in the photographs as persons who were in Los Alamos at the time but had since left.

Letters were then sent to these people asking for details and information on size, materials, etc., and it was possible to complete the drawing in this manner.

Although D-3 prefers to work with blueprints--and is able to do a full-color, three-dimensional drawing of an object, building or equipment from blueprints--there are, naturally, times when there are no blueprints. This is particularly true in the case of proposals for new facilities or buildings, such as Kiwi-A, PHERMEX, Scyllac or the meson facility where an illustration is desired before the blueprints are completed.

In these cases, the work is done with a great deal of help and assistance from those directly involved with the project. "They sometimes stand right over our shoulders to answer questions pertaining to size, scale, location and so on," Johnson noted.

Although D-3 makes every effort to fulfill a customer's request, there are certain things they cannot do. "We have had requests to do such things as highway signs and building markers," Johnson said, "but we have to refuse. We cannot do any work that has to 'weather' at all. We will do the initial design but not the finished product. Another request I have to refuse is the call to 'send me an illustrator.' If I did this, I would find myself sitting in an empty office within a month. The work has to be brought to our office where we have the facilities we need to do a good job."

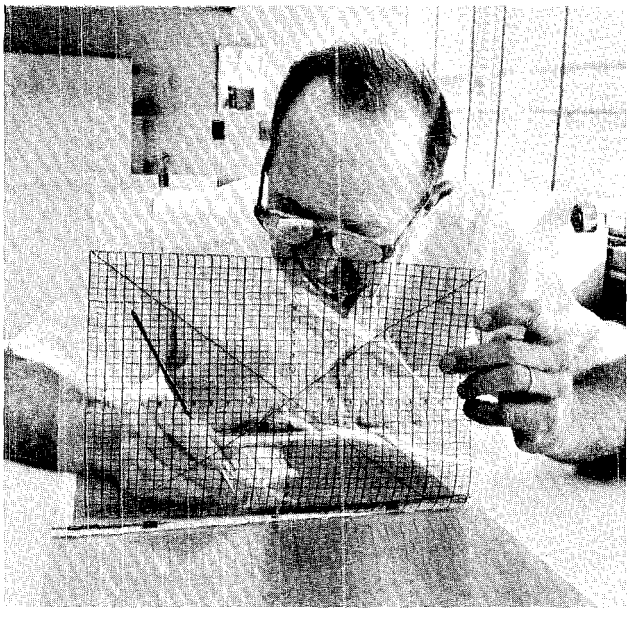
For the benefit of D-3's present and future customers, Johnson also offers a few suggestions:

--"We ask anyone with an illustration in mind to give us all possible information available to help in

continued on next page

D-3 group leader Bill Johnson and Eng-7 secretary Jean Hulette discuss a work order for an illustration.

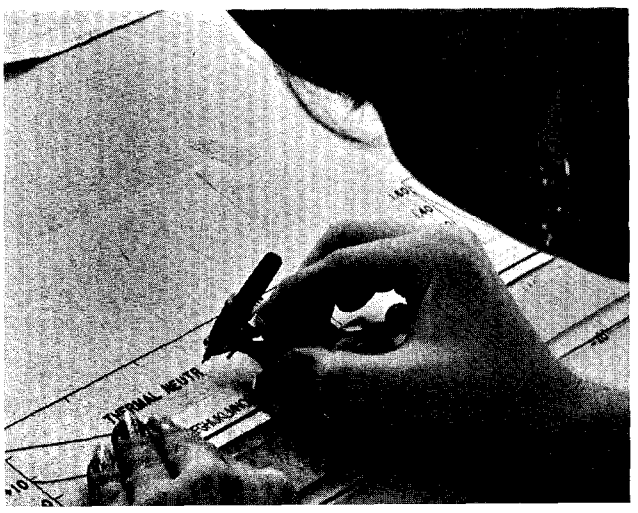
Hal Olsen uses an overlay sheet in drawing a series of sketches for animation in a documentary film.



Bob Davis works with an air-brush on a full-color scale drawing of the proposed new Scyllac project of Sherwood.

ABOVE: Jim Mahan's absorption in his work shows the careful attention D-3 puts on detailed work. BELOW: Evelyn Newell, D-3 group secretary, operates Vari-Typer which prints letters of varying sizes for posters and signs.

Glory Basmann letters identifying words onto a drawing.



LASL Artists . . .

continued from preceding page

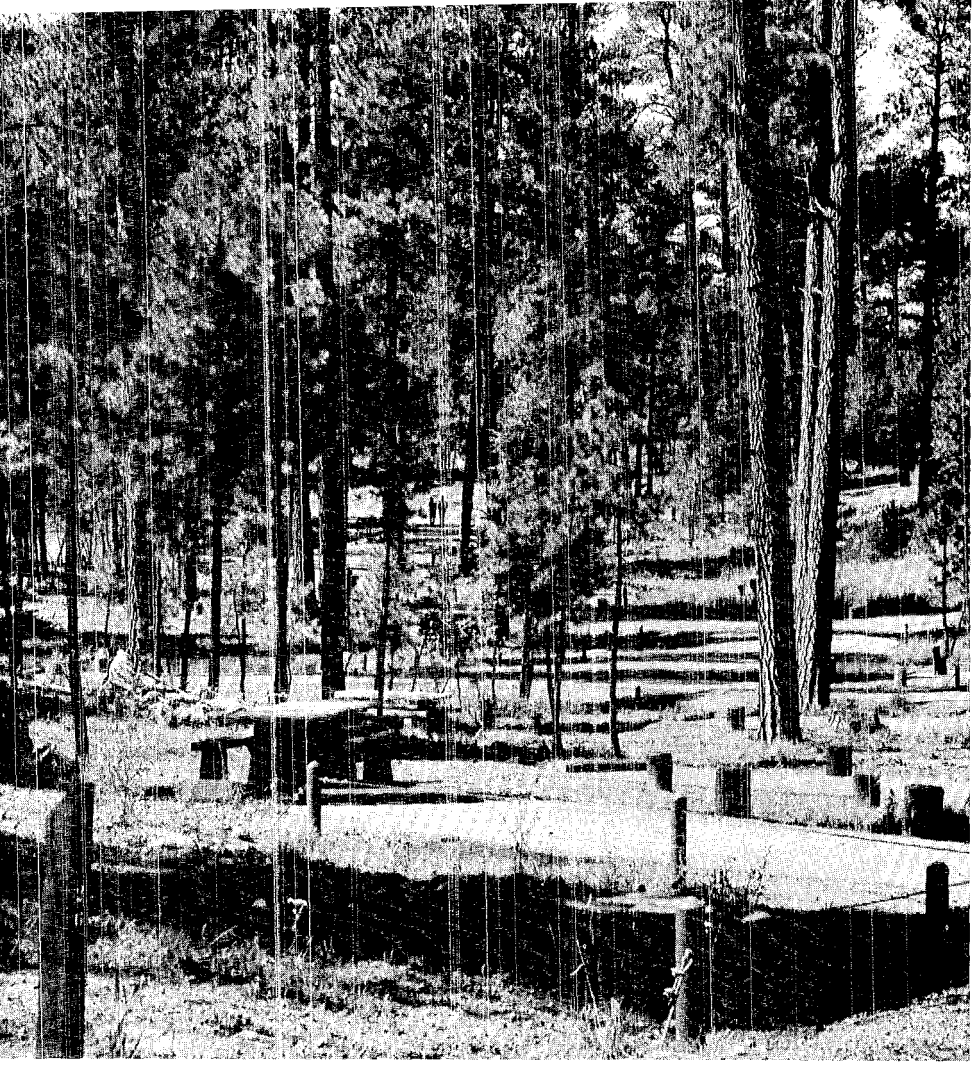
the job. If the information is sparse, please take a few minutes to do some sketches."

—The group is D-3 and not D-7. At one time D-3 was a part of D-7 but for more than a decade has been a separate group—"but occasionally we still get orders with D-7 on them."

—D-3 does not make slides. It delivers to the customer the original art tracing on linen, but the customer must take the linen to D-8—graphic arts—to have the slide made. Therefore, persons requiring slides should allow sufficient time for both the linen and the slide to be made.

—A work order must be signed by someone who has a card of authority on file in D-3. The group cannot accept the order unless this card is on file, signed by both the division or department head and the requestor.

—It takes a division or department head to sign a work order with an X-priority. "We feel our work order is simple enough for a six-year-old child to fill in . . . but we still get X-priority orders signed by someone other than a division or department head."



Picnic and camping areas at new Redondo campgrounds feature concrete picnic tables, paved roads and parking strips and buried garbage cans.

Redondo — New Campground In the Jemez

Photographs by Bill Jack Rodgers

One glance at the vehicles on any Los Alamos street provides proof enough that Los Alamos is a town full of camping enthusiasts. Whether "family car" or "second car," they range from the plushest of commercially-built campers to old pick-ups and four-wheel-drive vehicles with bedrolls tossed into the back.

And no wonder. Within a 50-mile radius of The Hill are at least that number of improved camping areas—mainly in the national forests, which more or less surround Los Alamos. The Santa Fe National Forest alone has more than 30 campsites in its two main sections —in the Jemez and in the Sangre de Cristos.

The newest of these improved camping areas is located on the southwest slope of the Jemez giant, 11,250-foot Redondo Peak. Only 28 miles from Los Alamos—just off State Route 4 past the Valle Grande and Jemez Falls—Redondo

Massive Redondo Peak towers over the Valle Grande, just off State Route 4.

Redondo . . .

continued from preceding page

campground was opened for public use just a few weeks ago.

Its 30 picnic units and 29 camping units each include a paved parking strip, picnic table, fireplace and buried garbage receptacle. The camping units are also equipped with "sink sumps" for trailer and camper plumbing drainage.

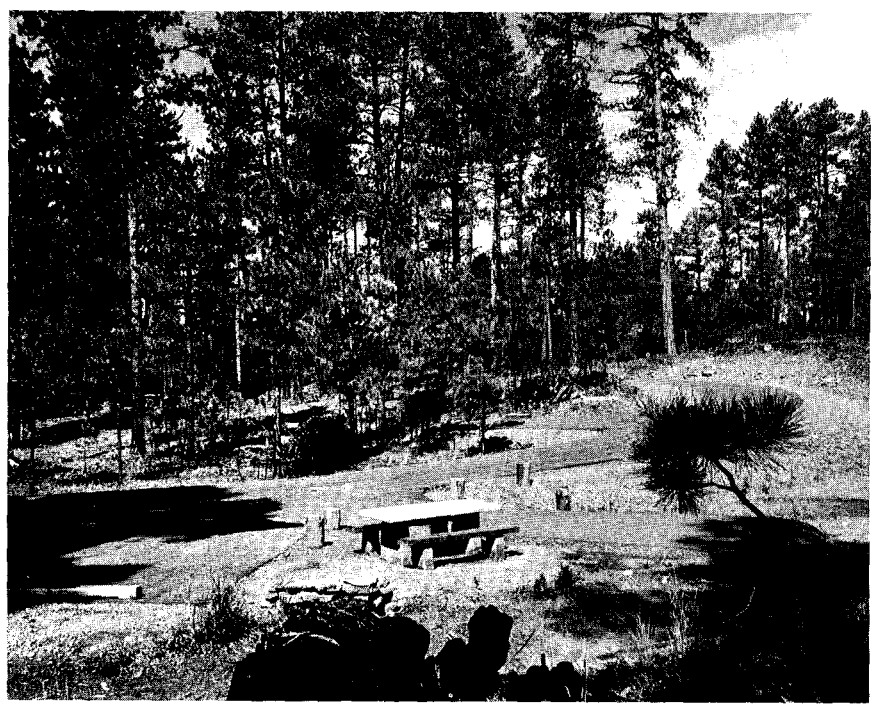
Water from the dozen or so faucets through out the campground is safe for drinking and is tested every week to 10 days. The campground is also equipped with restroom facilities, and the Forest Service provides piles of fire wood.

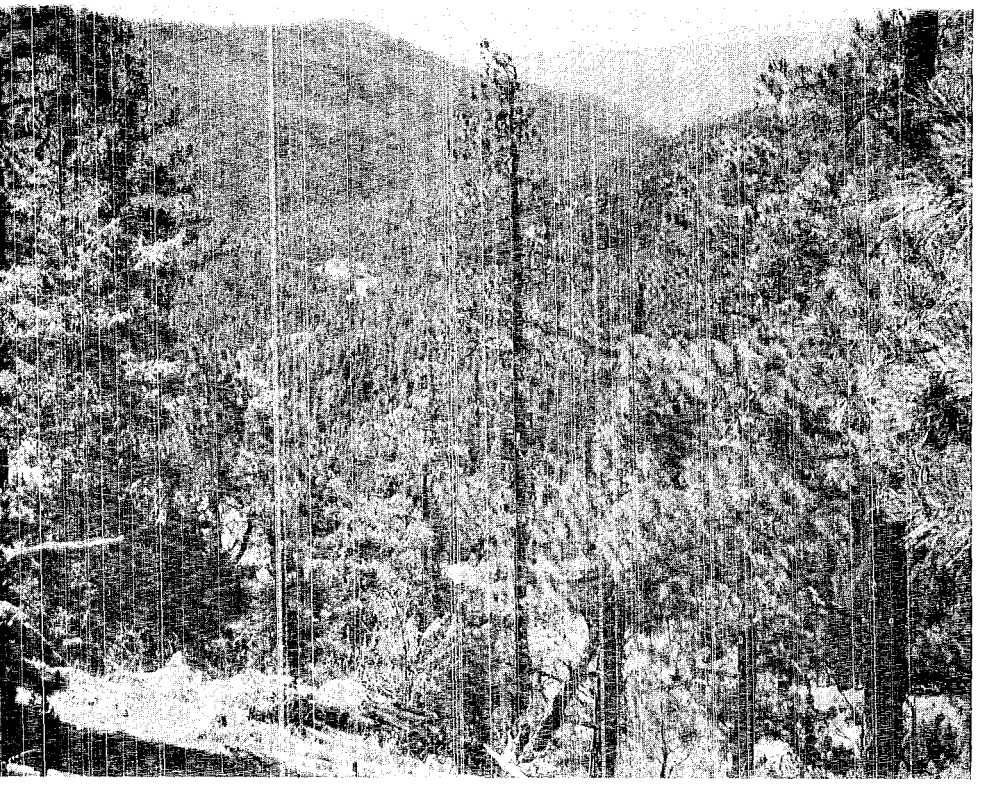
The roads that meander through the campground are paved. Some of them are portions of old logging roads and old highway 4.

Across the road from the campground is a rest area overlook with a spectacular view of Battleship Rock, Jemez Canyon and Virgin Mesa to the south. The Forest Serv-

continued on next page

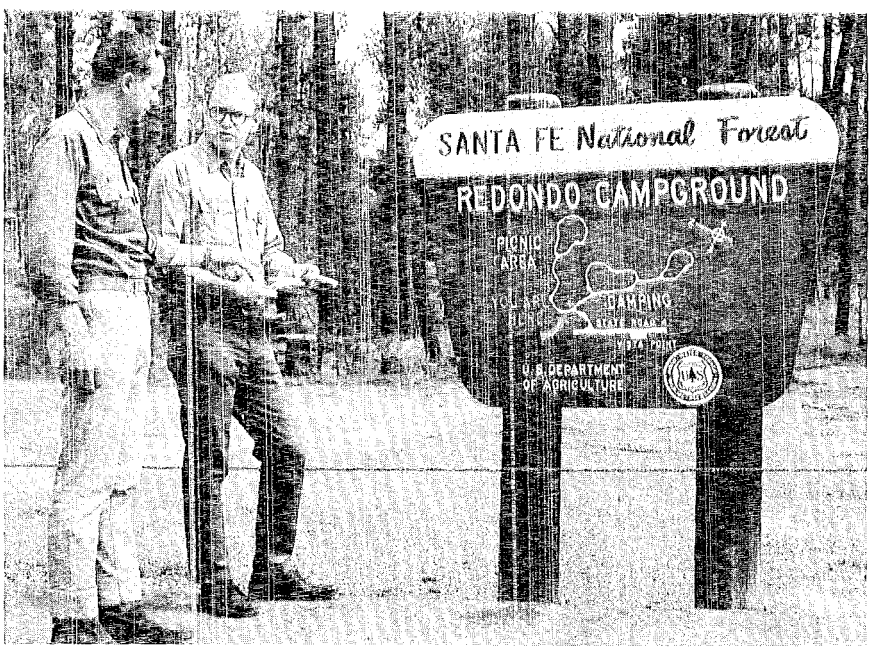
Although most of the picnic and camping sites are shaded by huge Ponderosa pines, the Forest Service architects deliberately placed a few of them in sunny spots for the stalwart souls who picnic on chilly days.





ABOVE: The forest rangers' friend, Smokey, the Bear, offers good advice to everyone. LEFT: Overlook across the road from the campground provides an impressive view southward. Road in center is State Road 4 winding toward Jemez Springs.

Tom Holden, left, architect in the Santa Fe National Forest supervisor's office, and Mike Wirtz, recreation director for the Jemez district, were on hand to see that all was in order when Redondo campground opened a few weeks ago.



ice plans to put up a number of signs explaining items of geological and botanical interest—such as various trees, wild flowers and rock formations.

"We have to be especially careful to be accurate with these signs," said one Forest Service man, "because you people from Los Alamos know all about these things."

The $7 annual "golden eagle passport"—the federal recreation permit—or a one dollar one-time-use charge will be required for camping and picnicking. It has not yet been decided whether an additional one dollar "user fee" will be charged eventually. The additional fee is sometimes required in campsites with improved facilities such as those at Redondo.

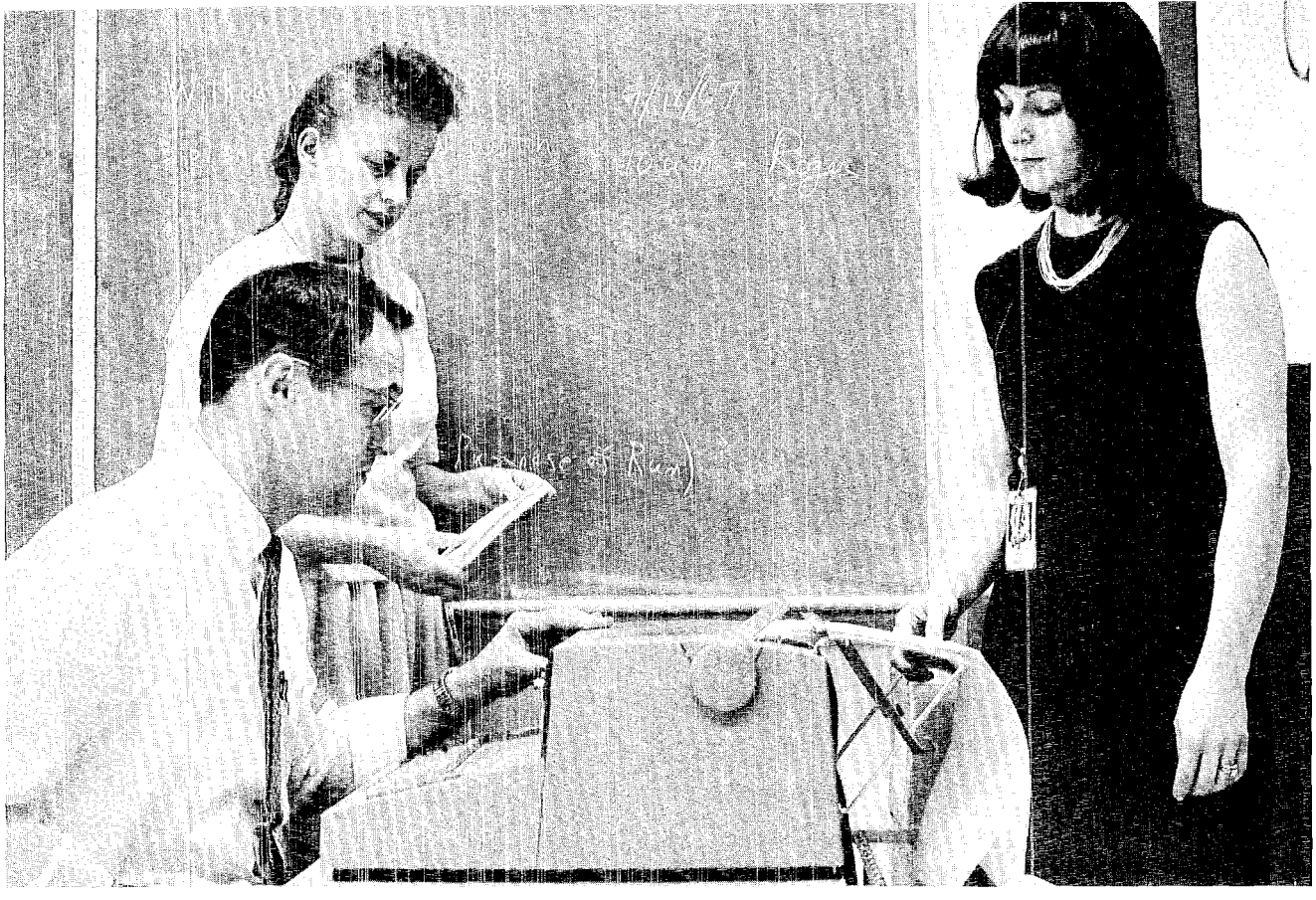
As with nearly all the National Forest campgrounds, Redondo will be available for use the year around. However, the water will be turned off during the winter, and roads within the campsite will not be plowed.

```
M.0076 RAX IS IN CONTROL, SIGN ON.
/ID DEMONSTRATION FOR THE ATOM
M.0073 ACTION IN PROGRESS.
M.0155  IN CASE OF RESTART, USE TERMINAL NO.  1
M.0072 BEGIN ACTIVITY.
/INPUT
/INCLUDE MODAYE
/END RUN
M.0073 ACTION IN PROGRESS.
                    SIZE OF COMMON  00000    PROGRAM  02132
END OF COMPILATION  DAYS
                    SIZE OF COMMON  00000    PROGRAM  00606
END OF COMPILATION  CALDAY
                    SIZE OF COMMON  00000    PROGRAM  00532

END OF COMPILATION  JAYDAY
               RANGE OF DATES IS FROM 1901 TO 2099, INCLUSIVE

                ENTER MONTH (I2) AND YEAR (I4) IN QUESTION
          OUTPUT WILL GIVE A CALENDAR FOR MONTH AND YEAR REQUESTED
                  A ZERO MONTH WILL STOP THE PROGRAM
M.0077 ENTER DATA.
101967

                          OCT    1967
                SUN  MON  TUES WED  THUR FRI  SAT
                  1    2    3    4    5    6    7
                  8    9   10   11   12   13   14
                 15   16   17   18   19   20   21
                 22   23   24   25   26   27   28
                 29   30   31

                ENTER MONTH (I2) AND YEAR (I4) IN QUESTION
          OUTPUT WILL GIVE A CALENDAR FOR MONTH AND YEAR REQUESTED
                  A ZERO MONTH WILL STOP THE PROGRAM
M.0077 ENTER DATA.
081945

                          AUG    1945
                SUN  MON  TUES WED  THUR FRI  SAT
                                  1    2    3    4
                  5    6    7    8    9   10   11
                 12   13   14   15   16   17   18
                 19   20   21   22   23   24   25
                 26   27   28   29   30   31

                ENTER MONTH (I2) AND YEAR (I4) IN QUESTION
          OUTPUT WILL GIVE A CALENDAR FOR MONTH AND YEAR REQUESTED
                  A ZERO MONTH WILL STOP THE PROGRAM
M.0077 ENTER DATA.
121941

                          DEC    1941
                SUN  MON  TUES WED  THUR FRI  SAT
                       1    2    3    4    5    6
                  7    8    9   10   11   12   13
                 14   15   16   17   18   19   20
                 21   22   23   24   25   26   27
                 28   29   30   31

                ENTER MONTH (I2) AND YEAR (I4) IN QUESTION
          OUTPUT WILL GIVE A CALENDAR FOR MONTH AND YEAR REQUESTED
                  A ZERO MONTH WILL STOP THE PROGRAM
M.0077 ENTER DATA.
00
STOP     00000
M.0070 ACTION COMPLETE.
M.0072 BEGIN ACTIVITY.
/DISPLAY INP01
M.0073 ACTION IN PROGRESS.
L.0001          SUBROUTINE INP
L.0002          COMMON TITLE(18),N,M,L,EPS,MAX,M1,M2,M3,AZ(10),Y(100),X(5,100),
L.0003         1W(100),AHAT(10),Q,YC(100),ITER,AA(10,10),AAINV(10,10),DET,A(10),F,
L.0004         2P(10),B(10),D(10),LW(10),MW(10)
L.0005  1       WRITE(6,100)
L.0006  100     FORMAT(///T2,'THIS PROGRAM DOES NON-LINEAR LEAST SQUARES CURVE FIT
L.0007         1TING.'/T2,'PLEASE TYPE A 9 IF YOU WISH TO ENTER DATA AT EXECUTION
L.0008         2TIME.'/T2,'OR A 5 IF FROM A DATA FILE.')
L.0009          READ(9,200)IN
L.0010  200     FORMAT(I1)
L.0011          IF(IN-5)1,2,6
L.0012  2       IF(L-6)3,3,4
L.0013  3       READ(5,300)(TITLE(I),I=1,18),N,M,L,EPS,MAX,M1,M2,M3,(AZ(J),J=1,L)
L.0014  300     FORMAT(18A4/3I4/E6.1,I4/3I4/6E12.7)
L.0015          GO TO 5
L.0016  4       READ(5,400)(TITLE(I),I=1,18),N,M,L,EPS,MAX,M1,M2,M3,(AZ(J),J=1,L)
L.0017  400     FORMAT(18A4/3I4/E6.1,I4/3I4/6E12.7/4E12.7)
L.0018  5       CONTINUE
L.0019          DO 10 I=1,N
L.0020  10      READ(5,500)Y(I),(X(K,I),K=1,M),W(I)
L.0021  500     FORMAT(6E12.7)
L.0022          GO TO 7
L.0023  6       WRITE(6,600)
L.0024  600     FORMAT(T2,'ENTER YOUR PROBLEM IDENTIFICATION(18A4).')
L.0025          READ(9,700) (TITLE(I),I=1,18)
L.0026  700     FORMAT(18A4)
L.0027          WRITE(6,800)
L.0028  800     FORMAT(T2,'ENTER THE NUMBER OF DATA POINTS, THE NUMBER OF INDEPEND
L.0029         1ENT VARIABLES,'/T2,'AND THE NUMBER OF PARAMETERS(3I4).  YOU MAY HA
L.0030         2VE UP TO 100 POINTS,'/T2,'5 VARIABLES, AND 10 PARAMETERS.')
L.0031          READ(9,900)N,M,L
L.0032  900     FORMAT(3I4)
L.0033          WRITE(6,1100)
L.0034  1100    FORMAT(T2,'ENTER THE CONVERGENCE CRITERION AND THE MAXIMUM NUMBER
```

RAX: LASL + UNM

BY BILL RICHMOND

Photographs by Bill Jack Rodgers



Roger Moore, T-13 alternate group leader, Jan Norris of T-13, and Mary Cherryhomes, group secretary, prepare to insert a program into the computer console.

A COMPUTER at the University of New Mexico's Computing Center in Albuquerque is receiving instructions from a remote console located at the Los Alamos Scientific Laboratory.

This "long-distance" computing and programming is made possible by a remote capability built into the IBM 360-40 computer. Roger Moore, alternate T-13 group leader, said LASL has made arrangements with UNM to provide the Laboratory with remote capability to use the computer.

"This setup, called the Remote Access Computing System—or RAX—is ideal for the small, casual user," Moore noted. With the extensive computing facilities at LASL, even the relatively simple problems can involve a lengthy time period. "It is a physical process which involves the punching of cards and then awaiting a turn on one of the computers," Moore said. "This can take hours."

However, with RAX the operator can input the data directly into the computer at UNM with a typewriter-style keyboard and receive the answer in a short time. "We can program directly into the computer in Albuquerque from the keyboard at LASL," Moore said.

The process is a simple one, according to Moore. LASL is allowed to use the computer during specified hours. During these hours, the console operator at T-13 can connect with the computer by dialing a prescribed telephone number at UNM. The phone

continued on next page

Gary Tietjen and Wes Rice, both of group T-13, scan the printout from the computer console in search of a particular answer.

RAX . . .

continued from preceding page

will ring once, and if the computer is ready it will respond with a high pitched tone. The console operator then places the telephone on "hold", replaces the receiver and waits until the computer gives the go-ahead on the print-out.

The machine is then ready to accept the program or problem.

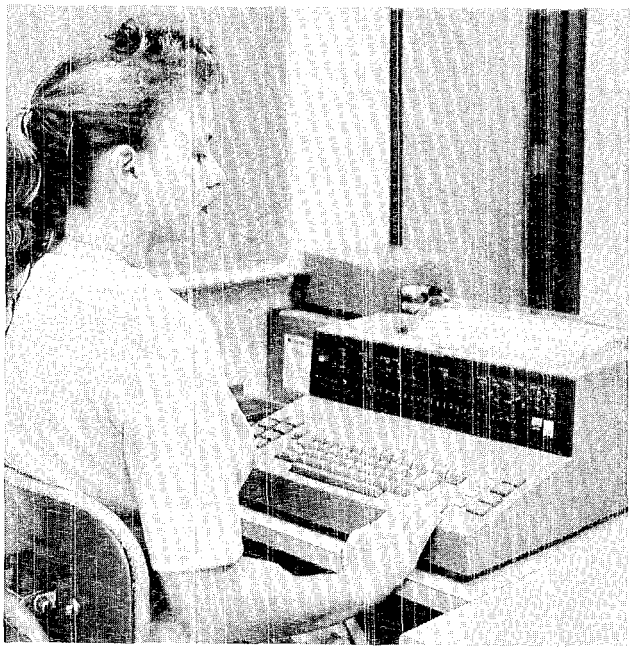
"The computer works on the time-sharing concept," Moore said. "It will work on one program for a few seconds and then switch to another program and so on. But it prints out so fast that a time lag is not noticeable."

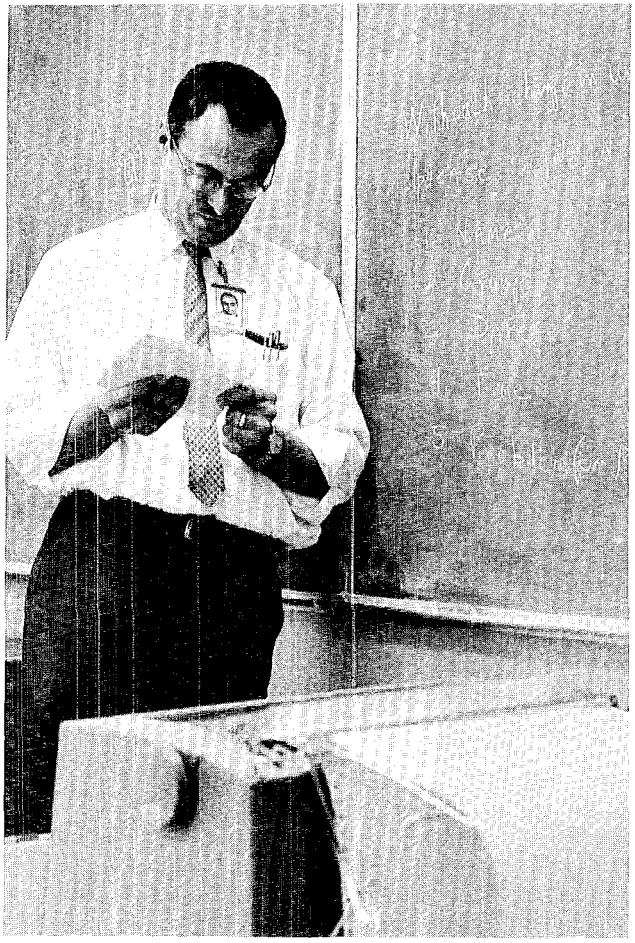
There is a variety of reasons behind the decision to join LASL and UNM in this project, according to Moore.

"The University wanted a non-UNM user to evaluate the system," Moore said, "someone who could possibly see any 'bugs' and offer suggestions or comments—and LASL has had much prior experience with computers. The entire time-sharing idea is relatively new to both LASL and UNM. It is expected that the arrangement—which is experimental—will be reviewed after about a year's experience."

Moore continued, "If their Computer Assisted Instruction (CAI) in the undergraduate mathematics program is effective, it could also be used in the undergraduate program at LASL which is run by the University."

Earlier this year, the National Science Foundation awarded UNM $50,000 in support of a computer





ABOVE: Jan Norris, T-13, prepares the computer console to receive instructions. RIGHT: Roger Moore, T-13 alternate group leader, decides the order in which the program cards will be inserted.

program for mathematics instruction. By the use of remote consoles, UNM students in certain mathematics classes will be able to utilize the computer at the computing center.

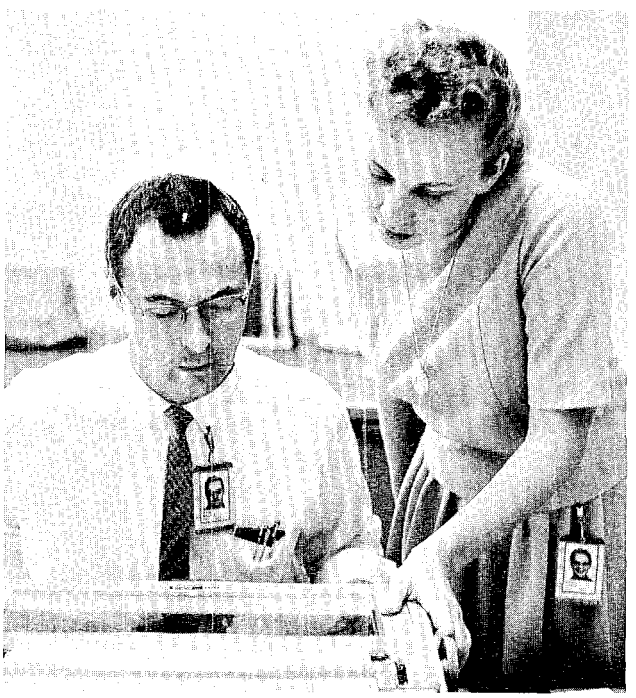
"Also," Moore said, "LASL wanted to add to its capability and increase our effectiveness to those who need to use the computers. We will also be able to use those statistical and mathematical programs already available in the computer."

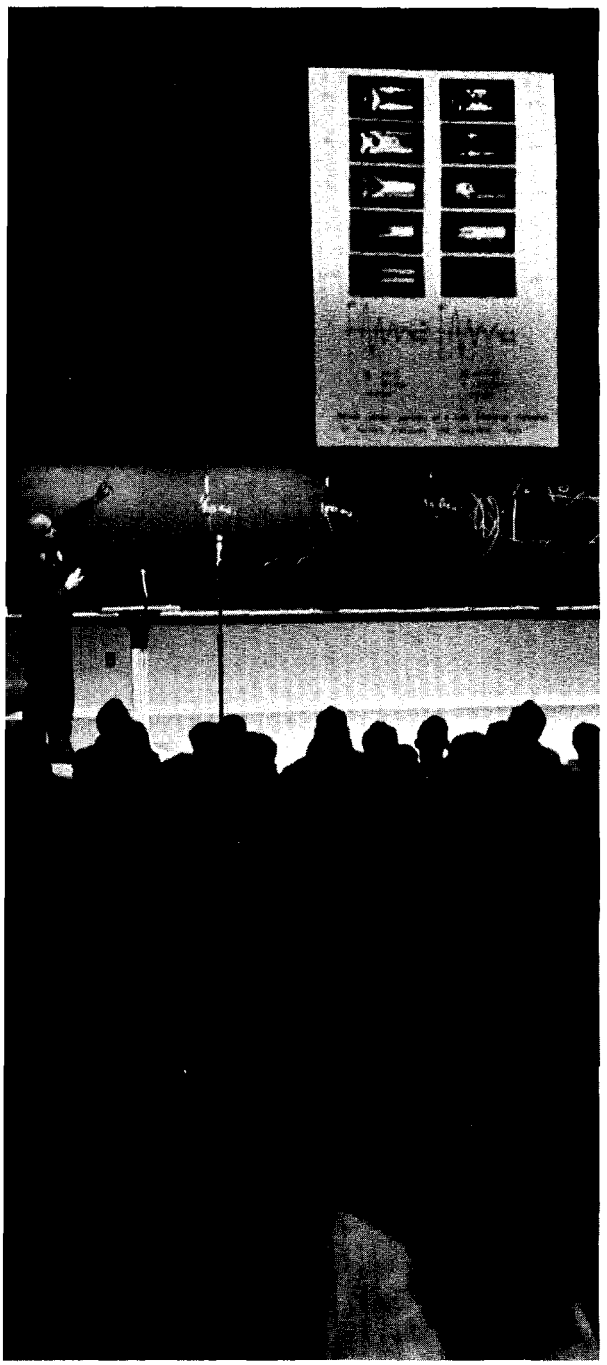
Another important reason from LASL's standpoint is the quickness of correcting errors. In the RAX system, if a simple mistake such as a misspelled word or error in calculation is made, it can be corrected right on the machine without waiting for the relatively lengthy "turn-around" time which is associated with conventional input procedures. With the computers at LASL, the error may not be caught until after the problem has set for several hours awaiting a turn at a computer and then is rejected when it does get into the computer.

There is no cause to worry about "saturating" the machine with a lengthy problem in RAX, Moore said, because even though others are using the computer at the same time, the small problem user experiences little sensation of waiting. Thus, there is no feeling of pressure or holdup.

UNM has announced it will eventually have about 24 remote consoles for their use plus the one at LASL. Moore said it would be possible to have a total of 63 terminals hooked up to the computer.

Moore and Jan Norris watch computer's reply to a question.





Formal conference sessions were held in the Physics Analytical Center auditorium. Ewald Fünfer, of Germany's Institut für Plasmaphysik, presented the first invited paper, "Survey On The Linear Theta Pinch Work in Garching", at the opening session.

Photographs by Bill Regan

Los Alamos Scientific Laboratory was host to 130 visitors, including 26 European scientists, who attended the four-day American Physical Society topical conference on "Pulsed High Density Plasmas" Sept. 19-22. Sixty LASL representatives also registered for the conference which attracted 58 papers on various aspects of controlled thermonuclear reaction research. Fred Ribe, P-15 group leader, was chairman in charge of local arrangements. Among the 26 European scientists who attended the APS topical conference were, from left, Paule Graf and Jean Paul Watteau, both CEA, France, and Heinz Knoepfel, Laboratori Gas Ionizzati, Italy. A crew of secretaries, headed by Betty Pohlman, P-15 group secretary, took care of signing up attendees for the conference and various social activities, including a picnic at Bandelier National Monument.

LASL Hosts Plasma Conference

Heinz Knoepfel, left, Laboratori Gas Ionizzati, Italy, listens to LASL's Fred Ribe, local arrangements chairman, describe the proposed Scyllac experiment.

The Technical Side

Seminar at U. S. Naval Postgraduate School, Physics Department, Monterey, Calif., July 28:

"Some Aspects of Nuclear Missile Vulnerability" by H. A. Sandmeier, T-DOT

Fourth Research Reserve Seminar in Applied Research, Albuquerque, Aug. 15:

"Medium Energy Physics Research and the LAMPF" by Louis Rosen, MP-DO

Conference on Projections and Related Topics, Clemson, S. C., Aug. 16:

"On Visual Hulls" by W. A. Beyer and S. Ulam, both T-8

Presentation at OMNITAB and OMNITEXT Workshop sponsored by Computer Service Department, National Bureau of Standards, Gaithersburg, Md., Aug. 25:

"The MADCAP Project: Motivation, Implementation and Rewards" by M. B. Wells, T-7

American Mathematical Society Meeting, Toronto, Ontario, Canada, Aug. 28-Sept. 1:

"Cantor-type interval dissections as random number tests" by W. A. Beyer, T-8

American Physical Society Meeting, Seattle, Wash., Aug. 31-Sept. 2:

"Numerical Studies of Regular and Mach Reflection of Shocks in Aluminum," by C. L. Mader, T-5

"Application of the Statistical Model of the Atom to Alkali Halide Crystals" by J. F. Barnes, T-5.

"A Design Study of a Quadrupole Whose Inner Current Conductors are Fed Through Magnetically Shielded Supports" by D. A. Baker, P-18, J. E. Hammel, P-17, and L. W. Mann, T-5.

"Elastic and Inelastic Scattering of Fast Neutrons from ^{6}Li and ^{7}Li" by J. C. Hopkins and D. M. Drake, both P-DOR, and H. Condé, Research Institute of National Defense, Sweden.

Second Meeting of the Pan-American Congress of Mechanical and Electrical Engineering and Related Disciplines, Caracas, Venezuela, Sept. 2-9:

"The Use of a Steam Ejector Vacuum System in a Highly Corrosive Furnace Atmosphere" by S. J. Bustamante, CMB-7

International Atomic Energy Agency Thermodynamics Symposium, Vienna, Austria, Sept. 3-9:

"The Actinide Carbides: A Review of Thermodynamics Properties" by C. E. Holley, Jr., CMF-2, and E. K. Storms, CMB-3

"Thermodynamics of the Plutonium Carbides" by W. M. Olson and R. N. R. Mulford, both CMF-5

"Thermodynamic Properties of Plutonium Compounds by Electromotive Force Techniques" by G. M. Campbell, L. J. Mullins and J. A. Leary, all CMB-11

"High Temperature Heat Content and Heat Capacity of Uranium Dioxide and Uranium Dioxide — Plutonium Dioxide Solid Solutions" by A. E. Ogard and J. A. Leary, both CMB-11

Symposium on the Dynamics of Two Phase Flow, Technological University of Eindhoven and EURATOM, Eindhoven, The Netherlands, Sept. 4-8:

"Similarity of Flow Oscillations Included by Heat Transfer in Cryogenic Systems" by F. J. Edeskuty and R. S. Thurston, both CMF-9

Tenth International Conference on Coordination Chemistry, Tokyo-Nikko, Japan, Sept. 7-30:

"Mixed Ligand Complexes in the Mercury-Cyanide-Iodide System" by R. A. Penneman, CMF-4

Presentations at Japan Atomic Energy Research Institute, Tokai, Japan; Tohoku University, Sendai, Japan; and Kyoto University, Kyoto, Japan, Sept. 7-30:

"Valence Stabilization and Coordination of Actinides in Fluoride Complexes" by R. A. Penneman, CMF-4

Presentation at Japan Atomic Energy Research Institute, Tokai, Japan, Sept. 7-30:

"Present Status of Actinides" by R. A. Penneman, CMF-4

International Conference on Nuclear Structure, Tokyo, Japan, Sept. 7-12:

"N=2 Configuration Mixing of Nilsson Orbitals" by M. E. Bunker, P-2, and C. W. Reich, Idaho Nuclear Corporation

Conference on Electromagnetic Isotope Separators and Their Applications to Nuclear Physics, Asilomar, Calif., Sept. 10-13:

"The LASL Plug-in Ion Source and Charge Vaporization System" by B. J. Dropesky and G. M. Kelley, both J-11

"Isotopic Separation of Short-Lived ^{123}Sn and ^{125}Sn for Fission Yield Measurements" by B. J. Dropesky, J-11, and B. R. Erdal, Washington University

Symposium on Detonations and Reactions in Shock Waves, American Chemical Society, Chicago, Ill., Sept. 10-15:

"Detonation Spin in Driven Shock Waves in a Dilute Exothermic Mixture" by G. L. Schott, GMX-7

Atomic Spectroscopy Symposium, National Bureau of Standards, Washington, D. C., Sept. 11-14:

"The LASL Automatic Comparator Computer Program" by D. W. Steinhaus, Kay J. Fisher, both CMB-1, and R. Engleman, Jr., GMX-2

continued on next page

the technical side . . .

continued from preceding page

22nd Annual Instrument Society of America Conference, Chicago, Ill., Sept. 11-14:

"Cryogenic Valve Testing" by E. R. Johnson, J-5 (NRDS)

International Union of Theoretical and Applied Mechanics International Symposium, Paris, France, Sept. 11-15:

"Theories of Detonation" by W. Fickett, GMX-10, and W. C. Davis, GMX-8

"Shock-Wave Compression of Porous Magnesium and Ammonium Sulfate" by J. O. Johnson and J. D. Wackerle, both GMX-7

"Shock-Wave Equation of State for High-Density Oxygen" by J. D. Wackerle and W. L. Seitz, both GMX-7, and J. C. Jamieson, University of Chicago

"The Determination of New Standards for Shock Wave Equation-of-State Work" by R. G. Mc Queen, S. P. Marsh and W. J. Carter, all GMX-6

"Hugoniots of Graphites of Various Initial Densities and the Equation of State of Carbon" by R. G. McQueen and S. P. Marsh, both GMX-6

Sixth International Conference on High Energy Accelerators, Harvard University, Cambridge, Mass., Sept. 11-15:

"Resonant Side-Coupled Cavity Electron Accelerators" by E. A. Knapp, W. J. Shlaer, G. R. Swain and J. M. Potter, all MP-3 (Invited talk)

"Stabilization of the Drift-Tube Linac by Operation in the 2 Cavity Mode" by D. A. Swenson, E. A. Knapp, J. M. Potter and E. J. Schneider, all MP-3

American Chemical Society Meeting, Reflectance Spectroscopy, Chicago, Ill., Sept. 11:

"The Present Status of Diffuse Reflectance Theory" by H. G. Hecht, CMF-2

Division of Nuclear Chemistry and Technology, American Chemical Society Meeting, Chicago, Ill., Sept. 12:

"Nuclear Space Propulsion beyond Rover" by T. P. Cotter, N-5 (Invited talk)

Symposium on Nuclear Chemical Aspects of Space Exploration, American Chemical Society Meeting, Chicago, Ill., Sept. 12-15:

"The Rover Nuclear Rocket Program" by R. W. Spence, N-DO

Conference on Chemical Vapor Deposition of Refractory Metals, Alloys and Compounds, Gatlinburg, Tenn., Sept. 12-13:

"Chemical Vapor Deposition of W-Mo-Re Ternary Alloys" by C. I. Fairchild, CMB-6

Atomic Energy Commission — National Aeronautics and Space Administration Contamination Control Symposium, Sandia Corporation, Albuquerque, Sept. 12-14:

"Methods and Instrumentation for Monitoring Radioactive Contamination" by F. L. Fey, Jr., H-1 (to be presented by E. A. Bemis)

Third International Symposium on High Temperature Technology, Asilomar, Calif., Sept. 17-20:

"A Method for Correcting Knudsen Vapor Pressures for Cell-Vapor Interactions" by J. W. Ward, CMF-5

"The Formation of Carbide Surfaces on Tantalum and Tantalum-Tungsten Alloys" by N. H. Krikorian, T. C. Wallace, R. Krohn and M. G. Bowman, CMB-3

"Liquid Structure as Deduced from Precise Thermodynamic Measurements" by G. R. B. Elliott and D. R. Conant, both CMF-2, H. S. Swofford, Jr., University of Minnesota, and B. L. Houseman, Goucher College

"Materials Problems in High Temperature Nuclear Reactors" by M. G. Bowman, CMB-3

International Conference on Localized Excitations, Irvine, Calif., Sept. 18-22:

"Energy Flow in Disordered Lattices" by D. N. Payton, III, M. Rich and W. M. Visscher, all T-9 (movie)

"The Role of Localized Vibrational Modes in Heat Conduction" by D. N. Payton, III, M. Rich and W. M. Visscher, all T-9

Presentation at Advisory Group for Aeronautical Research and Development (AGARD) Seminar, Teddington, England, Sept. 18-21:

"Computer Studies of Time Dependent Flows" by C. W. Hirt, T-3

Atomic Energy Commission and Contractors Safety Meeting, Argonne National Laboratory, Argonne, Ill., Sept. 19:

"Guide to Electrical Safety in Research" by T. E. Ehrenkranz, H-3

Eighth Annual Symposium on Physics and Nondestructive Testing, Baton Rouge, La., Sept. 19-21:

"Quantitative Determination of Boron Content in Reactor Control Plates Utilizing Epicadmium Neutron Transmission Measurements" by D. A. Garrett and R. A. Morris, both GMX-1, and M. M. Thorpe, N-6

American Physical Society Topical Conference on Pulsed High Density Plasmas, Los Alamos, Sept. 19-22:

"Faraday Rotation Measurements on the Scylla IV Theta-Pinch" by R. F. Gribble, E. M. Little and W. E. Quinn, all P-15

"Measurement of Theta-Pinch Loss Using a Gas Laser Interferometer" by K. S. Thomas, P-15

"The 15-Meter Scyllac Theta-Pinch" by E. L. Kemp, P-16, W. E. Quinn, F. L. Ribe and G. A. Sawyer, all P-15

"COLUMBA—A High Temperature Z-Pinch Experiment" by J. A. Phillips and A. E. Schofield, both P-14, and J. L. Tuck, P-DO

"Coaxial Gun Development" by I. Henins, P-17; P. S. Henry, Princeton University; J. Lohr, University of Wisconsin; and J. Marshall, P-17

new hires

CMB Division

Leon J. Radziemski, Jr., Dayton, Ohio, CMB-1

Bruce D. Campbell, Providence, R. I., CMB-8

CMF Division

Melvin D. Daybell, Las Cruces, N. M., CMF-9

Robert L. Von Berg, Ithaca, N. Y., CMF-9

Director's Office

Kathleen J. Holliway, Los Alamos, Dir. Off.

D Division

Ruby N. Mills, Los Alamos, D-2

Glory E. Basmann, Los Alamos, D-3

Engineering Department

Roger D. McDaniel, Las Cruces, N. M., ENG-1

Mariano Vigil, Fairview, N. M., ENG-2 (casual)

Harold W. Armstrong, Albuquerque, ENG-3

Warren D. Lutes, Woodland Hills, Calif., ENG-3

James A. Messimer, Albuquerque, ENG-3

Gerald F. Hackman, Albuquerque, ENG-3

Walter E. Carlson, Skokie, Ill., ENG-3

Frances N. Rogers, Los Alamos, ENG-5 (casual)

James Wing, Cedar Rapids, Iowa, ENG-7

GMX Division

Jerry H. Atencio, Espanola, GMX-8

Timothy, R. Neal, Ithaca, N. Y., GMX-11

H Division

Alan L. Hack, Bronx, N. Y., H-3

Ronald A. Walters, Fort Collins, Colo., H-4

J Division

Miles A. Hindman, Columbus, Ohio, J-8

Jerry L. Dunn, Toronto, Ontario, Canada, J-10

Richard C. Ragaini, Cambridge, Mass., J-11

Rodney L. Berriker, Windsor, Conn., J-17

K Division

James L. Meem, Jr., Charlottesville, Va., K-1

MP Division

Walter L. Hawkins, Dallas, Texas, MP-AE (MP-2)

Duard L. Morris, Las Cruces, N. M., MP-AE (MP-2)

Celestino R. Quintana, Santa Fe, MP-2

Martin L. Milder, Columbus, Ohio, MP-4

William V. Hassenzahl, Urbana, Ill., MP-4

Mail and Records

Tony A. Rivera, Santa Fe, M&R

Michael D. Little, Albuquerque, M&R-1

N Division

Phillips A. Dodd, Palo Alto, Calif., N-4

Patricia A. Turner, Los Alamos, N-6

Wendell R. Duncan, Kansas City, Mo., N-6 (casual-rehire)

Ronald H. Augustson, Troy, N. Y., N-6

Robert D. McFarland, Thousand Oaks, Calif., N-7

P Division

Lynn Veesor, Madison, Wis., P-DOR

Joe F. Trujillo, Salt Lake City, Utah, P-15

Personnel Department

James H. Miller, III, Dallas, Texas, PER-1

Leora Mitchell, Los Alamos, PER-4

Shops Department

Jack E. Smith, Beaver Falls, Pa., SD-DO

Supply and Property

Sandra M. Padilla, Santa Fe, SP-3

T Division

Alice A. Singer, Espanola, T-1

Richard R. Silbar, Washington, D. C., T-9

the technical side . . .

"Computer Simulation of the Theta-Pinch" by T. A. Oliphant, Jr., P-18

"Hydromagnetic Equilibrium of A Thin-Skin, Finite Beta Toroidal Plasma Column" by J. L. Johnson, Princeton University, R. L. Morse and W. B. Riesenfeld, both P-18

"Z-Dependent Marginal Stability of the Rigid Rotor Model of a High Beta Theta-Pinch" by J. P. Freidberg and R. L. Morse, both P-18

"Two Dimensional Equilibrium for High Beta Mirror Devices Including Particle Loss" by W. Grossmann, Jr., and J. P. Freidberg, both P-18

"Coaxial Snowplow Discharge" by T. D. Butler, T-3, I. Henins and J. Marshall, both P-17, and R. L. Morse, P-18

"Some Characteristics of the Dense Plasma Focus" by J. W. Mather, P. J. Bottoms and A. H. Williams, all P-7 (Invited talk)

"Sheath Stability" by R. L. Morse, P-18

"An Explosive Generator Powered Theta-Pinch" by D. B. Thomson and R. S. Caird, both GMX-6; K. J. Ewing, GMX-3; C. M. Fowler and W. B. Garn, both GMX-6; J. C. Crawford and R. A. Damerow, both The Sandia Corporation.

Second Meeting on Practical Aspects of Activation Analysis with Charged Particles and Photons, Liege, Belgium, Sept. 21-22:

"The Determination of Oxygen and Carbon in Germanium by ^3He Activation" by D. M. Holm, K-1; W. L. Briscoe, P-1; J. L. Parker and W. M. Sanders, both K-1; and S. H. Parker, University of Pennsylvania

14th Annual Assembly of the International Union of Geodetics and Geophysics, Zurich, Germany, Sept. 25-29:

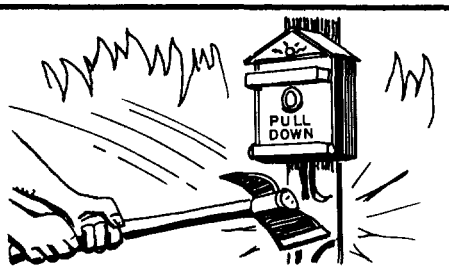
"The Equation of State of Solids Obtained from Shock-Wave Experiments" by R. G. McQueen, GMX-6

Physical Science Symposium, Meeting of New Mexico Academy of Science, Sandia Corporation, Albuquerque, Sept. 29:

"Reactions of He with N_2 and O_2 in the Upper Atmosphere" by W. B. Maier, II, J-10

"A Computer Model for Lung Tumor Risk from Inhaled Radioactive Particles, with Emphasis on Plutonium Oxide" by P. N. Dean, H-4

20 years ago in los alamos



Culled from the files of the Los Alamos Times, October, 1947, by Robert Y. Porton

League Forms on Hill

Mrs. F. M. Walters has been elected the first president of the League of Women Voters. At a meeting in the Town Council Hall, Mrs. Walters announced that the League has passed the small discussion group stage necessary to be recognized by the national board. Membership is now open to Los Alamos women interested in promoting good government. Those wishing to join are asked to contact Mrs. Norris Bradbury or Mrs. Raemer Schreiber.

AEC Guards to Police Town

The first contingent of the Atomic Energy Commission's civilian security guards—96, in snappy blue and black uniforms—reported for duty this week. They will take over policing of Post One and the town beat, replacing the Military Police Detachment.

Spectacular Fire Destroys Warehouse

A fire, which afforded a thrill for hundreds who gathered to watch it, razed a warehouse building and destroyed 200 new heating units stored there. Firemen got a late start because of misdirection by telephone and wrong operation of a fire alarm box. Fire Chief Harold Moore gave two warnings to residents after the blaze was brought under control—"Learn the operation of fire alarm boxes and don't send in alarms by telephone." The conflagration was a double headache for the chief and his department, coming right smack dab in the middle of Fire Prevention Week.

Name John Macy Personnel Director

Appointment of John W. Macy, Jr., to be director of personnel at the AEC's Santa Fe Operations Office was announced this week by Carroll L. Tyler, Manager. Macy, a native of Winnetka, Ill., is a graduate of Wesleyan University and served in the Armed Forces as a personnel officer in the Air Force. He joined the Washington office of the Atomic Energy Commission in July and was transferred to Los Alamos this month. (Editor's note: Macy is now the chairman of the U.S. Civil Service Commission).

AEC Chairman Tours Project

David E. Lilienthal, chairman of the Atomic Energy Commission, visited the Hill to make a brief but informative inspection of facilities. While here, he conferred at some length with AEC and Laboratory officials. He stated that the AEC, thus far, has succeeded in its primary aim—to keep the nation "preeminent in the field of atomic energy and, if at all possible, to widen its present leadership."

what's doing

FILM SOCIETY: Civic Auditorium, admission by single ticket, 90 cents, or season ticket, $4.

Wednesday, Oct. 18, 7 and 9 p.m., "Flamenco"

ADULT BASKETBALL: Griffith Gym, every Tuesday evening from 7 to 10 p.m. Now through April. For further information, call Bill McCall, 2-2456.

MESA PUBLIC LIBRARY EXHIBITS:

Art Exhibits:

Sept. 29-Oct. 19—Oils by Virginia Thorn, White Rock

Oct. 21-Nov. 11—Watercolors by Pat Trujillo, Los Alamos

Case Exhibit:

Sept. 29-Oct. 27—Fused glass objects by Caryl McHarney, Albuquerque.

PUBLIC SWIMMING: Los Alamos High School pool. Adults, 50 cents; students 25 cents.

Monday through Thursday, 7:30 to 9:30 p.m.

Saturday and Sunday, 1 to 6 p.m.

Sunday, 7 to 9 p.m. Adults only.

INDUSTRIAL SKETCHING CLASS: Ted Claus, Santa Fe, instructor. Sponsored by New Mexico Arts and Crafts Center, Pojoaque. Ten-week class, Wednesday evenings, tuition $38. For additional information call Santa Fe 455-2543.

OUTDOOR ASSOCIATION: No charge; open to the public. Contact leader for information about specific hikes.

Sunday, Oct. 8, Pajarito Mountain to Sawyer's Hill. Terry Gibbs, leader, 8-4909.

Sunday, Oct. 15, Aspen Hike. Herb Vogel, leader, 2-2181.

Saturday, Oct. 21, Bandelier Headquarters to Stone Lions. Virginia Winsor, leader, 2-3440.

Sunday, Oct. 29, Upper Crossing to Bandelier Headquarters via Alamo Canyon. Ed Kmetko, leader, 2-3173.

TRAVEL SLIDE PROGRAM: Mesa Library, 7:30 p.m.

Thursday, Oct. 19—"Japan," by Morris Milligan

Thursday, Nov. 2—"Yucatan," by Kay Harper

LOS ALAMOS CONCERT ASSOCIATION: Fall campaign Oct. 2 through 9 for those people new in town or who were out of town during campaign earlier in year. Season tickets $8.50 for adults, $4 for students. Season tickets also honored at Santa Fe and Las Vegas concerts through reciprocal arrangement. Tickets available any time through Mrs. Henry Filip, 2-2135, or at door preceding first Los Alamos concert. Regular season prices are $10.50 for adults, $5 for students. Schedule:

Los Alamos:

Saturday, Oct. 28—Julian Bream, guitar and lute, 8:15 p.m., Civic Auditorium.

Santa Fe:

Monday, Oct. 30—Netherlands String Quartet, 8:15 p.m., Lensic Theater, 211 W. San Francisco, Santa Fe.

Los Alamos Medical Center's Inter-Faith Chapel, for many months a dream in the form of an architect's sketch, took form and substance with the arrival and installation of two major items of decoration. Albuquerque artist Max Chavez, left, and Mrs. Delbert F. Sundberg, president of the Los Alamos Council of Church Women United, admire the carved, stained glass doors Chavez made for the chapel. In background is a portion of the altar wall screen designed and executed in a sandblasting-carving technique by another Albuquerque artist, Mrs. Florence Pierce. Planning started in February for the chapel which will provide a place for prayer and meditation as well as ministerial counseling and care of hospital patients and their families. About half of the $3000 set for completion of the project has been raised. Los Alamos churches have helped in raising funds, with the chapel committee of the Council of Church Women serving as coordinators for the project. Mrs. Cletis Land is chapel committee chairman. Donations are needed and can be made through any Los Alamos church or to the LAMC Chapel Fund in care of Mrs. Edwin Kemp.

BACK COVER:

Site preparation and utilities services for the proposed meson accelerator facility on Mesita de los Alamos are nearing completion. Zia lineman Alva Bryan is almost dwarfed by a large drill making a hole for a temporary power pole for electrical service needed during construction. Excavation is nearly finished for the future underground accelerator beam channel--at left--which is about a half mile long. The flat area behind the drill is the future location of the accelerator's injector building, which will direct a beam of protons into the accelerator sections located in the beam channel. At the end of their half-mile-long flight, the protons will attain a speed equal to 84 per cent of the velocity of light as they reach the experimental area where they will be used in various research programs in nuclear physics.

Henry T. Motz
3187 Woodland
Los Alamos, New Mexico 87544